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Research reviews are presented for eight areas of exceptionality and for administration. Included are the following reports: 16 on the gifted compiled by Edward C. Frierson; 46 on the mentally retarded reviewed by Howard H. Spicker and Nettie R. Bartel; 20 on the visually impaired presented by William J. Tisdall; 44 on the hearing impaired discussed by William N. Craig; and nine on cerebral dysfunction described by William J. Meyer. Compilations are also presented: 21 articles on orthopedic disabilities and special health problems by Gary A. Best and Dewey G. Force, Jr.; 29 on speech, language, and communication disorders by James O. Smith and Thomas C. Lovitt; 41 on behavioral disorders by Paul S. Graubard and Martin B. Miller; and 18 on administration by James C. Chalfant and Robert A. Henderson. (RJ)

G. Orville Johnson, Harriett D. Blank, Editors

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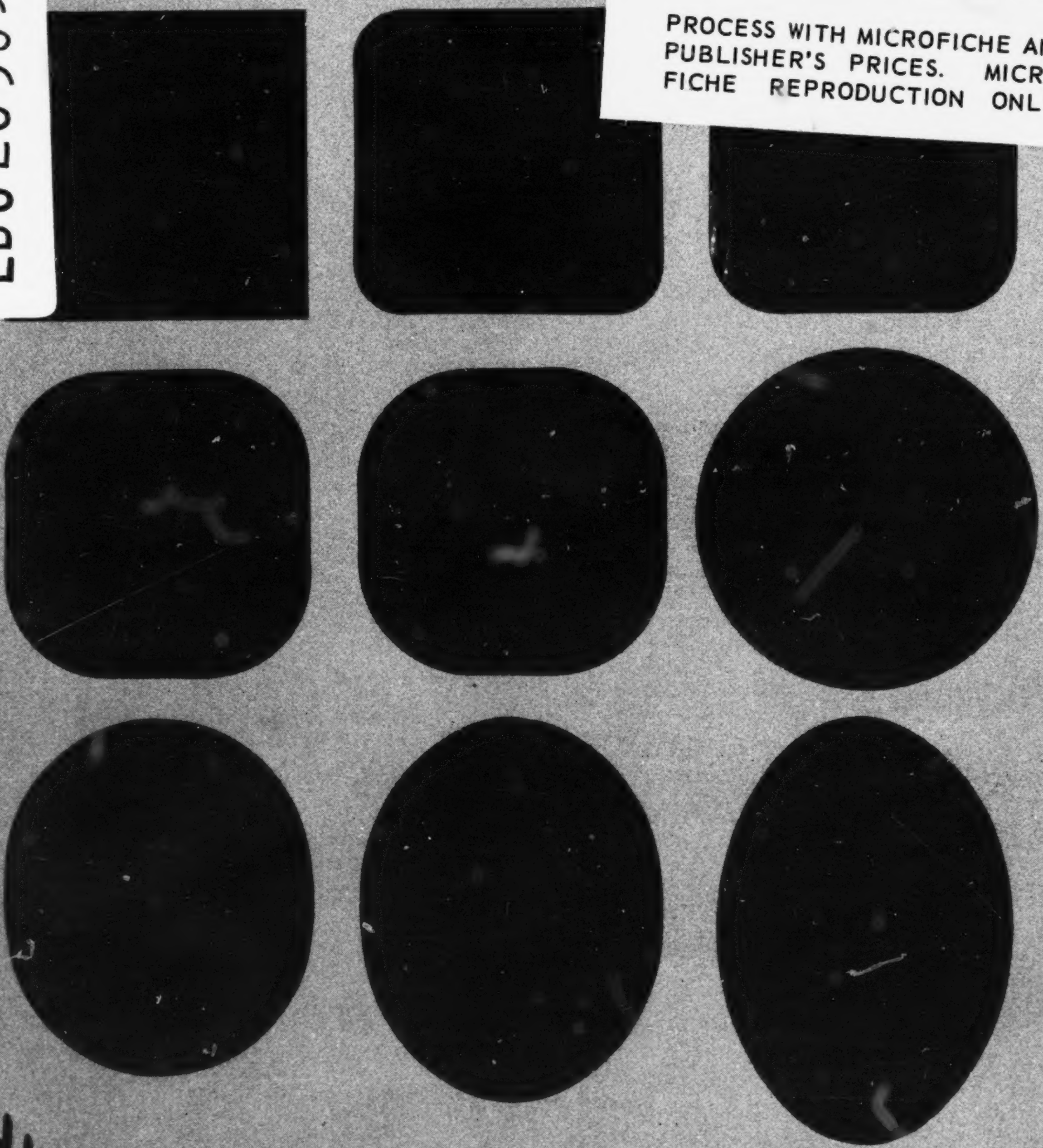

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EXCEPTIONAL CHILDREN RESEARCH REVIEW

THE COUNCIL FOR EXCEPTIONAL CHILDREN

Exceptional Children Research Review

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Exceptional Children Research Review

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Preface

It has been five years since Samuel A. Kirk and Bluma B. Weiner prepared the original *Behavioral Research on Exeptional Children.* During that relatively short period of time, a larger amount of research has been conducted than during any other comparable period in history. Since this accelerated rate of potential acquisition of information is undoubtedly going to continue, some rapid method of effectively reviewing recent work is necessary to enable persons in the field (teachers, administrators, college personnel, researchers, and others) to keep up with the information becoming available and then to put it into practice. This, briefly, explains the reason for this volume.

The present monograph follows the same basic outline of topics used in the original publication with only a few exceptions. "The Educable Mentally Retarded" and "The Trainable Mentally Retarded" have been combined into a single chapter entitled "The Mentally Retarded." Similarly, "The Hard of Hearing" and "The Deaf" as well as "The Emotionally Disturbed" and "The Delinquent" have been combined to form single chapters entitled "Hearing Impairment" and "Behavioral Disorders," respectively.

The authors deserve commendation on their ability to deal with the problems it was necessary for them to overcome in the preparation of their manuscripts. Among these were the large number of studies that had to be reviewed and the limited accessibility of many of them. Since the *Review* is selective, it was necessary to examine a large amount of material before choices could be made. Many of the studies are available only in governmental agency and private foundation reports. Our plea to researchers in general is, "Get your findings before the public so that use may be made of them."

The editors feel that a brief comment needs to be made in regard to the general format and chapter headings of the present *Review.* The education of exceptional children has traditionally encompassed six handicapping conditions: the mentally retarded, emotionally disturbed, visually handicapped, hearing impaired, orthopedically handicapped, speech handicapped, and gifted. During the past two or three decades, these traditional categories have been subdivided, extended to become more inclusive, and enlarged. Examples of this trend are reflected in such terms as "severely mentally retarded," "exogenous," "brain injured," "language and communications disabilities," "cerebral dysfunction," "special health problems," and "learning disabilities," to mention only a few. Some of them, because they appear to refer to a unique and distinct content, have been included in the present volume. Others have either been arbitrarily excluded or the research subsumed under one or more other disability groupings. Actually, the potential for such proliferation is almost limitless.

Many, if not all, of these latter groupings can and do overlap the older, traditional categories, including the gifted. Children with any level of intelligence and/or physical or sensory handicap may also be handicapped in one or more other ways. The trend appears to be in the direction of grouping according to function, insofar as learning is concerned, and away from the physical or medical characteristics which have little or no direct value for education. Future editions of CEC's research reviews will undoubtedly reflect this change in approach.

G. Orville Johnson and Harriett D. Blank

Exceptional Children Research Review

1

The Gifted

Edward C. Frierson

The most revealing statement concerning the present research explosion in the area of giftedness, creativity, and gifted persons was made recently by Parnes and Brunelle (1967), who summarized:

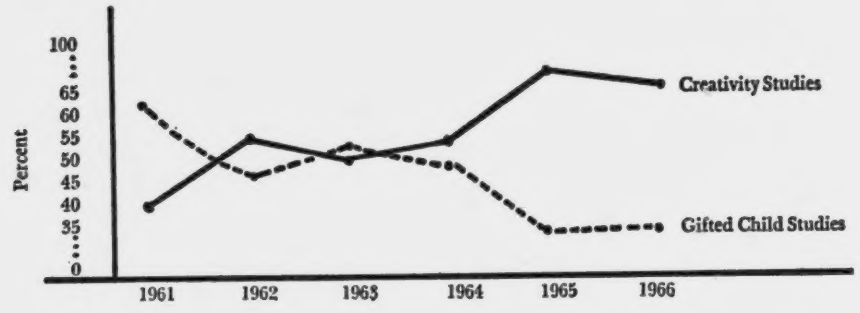
> Approximately 1250 bibliographic entries on creativity have appeared in the last year and one-half. A rough but dramatic indication of the explosion of literature on creativity is that in sheer bulk the research from January, 1965 to June, 1966, equals that of the preceding five years, which in turn matches that of the preceding ten years, and that again balances the work of the preceding one-hundred years [p. 52].

An analysis by Noffsinger (1968) of 31 education and psychology journals published in the five year period from 1961 to 1966 revealed that a dramatic shift has occurred in the focus as well as the quantity of research on the gifted. After eliminating published duplications and examining unpublished studies, Noffsinger compared the proportion of reported studies which dealt primarily with creativity to studies directed toward all other aspects of gifted children. The result shown in Figure 1 indicates that creativity has "emerged as a new area of behavior study" and has attracted a large number of new researchers. Creativity was the central theme in only 39 percent of the studies published in 1961, while guidance of the gifted, educational practices, and other themes were central to more than 60 percent of the studies analyzed. By 1965, creativity was the dominant aspect of 66 percent of the studies analyzed, and this figure was virtually unchanged in 1966.

Using a chi square analysis, Noffsinger demonstrated the "significance" of the shift of research attention during 1961 to 1965 from gifted children and their welfare to creativity and its nurture.

FIGURE 1

Research Studies on Creativity and Gifted Children Published during the Period 1961-1966 Reported as Percentage of Total



In view of the marked increase in studies of creativity since 1965, one might expect a real breakthrough to have occurred in understanding this construct. However, Yamamoto's report, "Creativity —A Blind Man's Report on the Elephant" (1965) is as applicable today as it was when published at the beginning of the mid Sixties creativity research explosion. The confused picture of the "elephant," according to Yamamoto, is a result "not so much of the restricted nature of their [researchers] exploratory activities as of the radically different expectations with which explorations are initiated [p. 428]." Basic philosophical differences among workers were considered responsible for the failure to reach agreement about creativity. Those differences are present still. Studies of creativity since 1965 continue to reflect (a) different points of departure in the definition of creativity, (b) different assumptions and presuppositions about creativity, and (c) different research strategies among and within groups of workers with different orientations.

The present review was undertaken within the context of the "creativity research explosion." Other important research reviews related to gifted children and creativity have been published since 1960, while many unpublished documents such as those of Torrance (1959, 1960) anticipated the present surge. The reader unfamiliar with the following sources will find them extremely helpful, as they provide the foundation beyond which the present review is extended.

1. *Creativity and the Individual,* Stein and Hesinze (1960)
2. *A Sourcebook for Creative Thinking,* Parnes and Harding (1962)
3. *Behavioral Research on Exceptional Children,* Kirk and Weiner (1963)
4. *Creativity: Progress and Potential,* Taylor (1964)

5. *Annotated Bibliography on Creativity and Giftedness,* Gowan (1965)
6. "The Gifted," Gallagher and Rogge (1966), In *Review of Educational Research.*

The most recent review (Gallagher and Rogge, 1966) summarized research from February, 1963, to June, 1965, in the following way:

> During these three years there have been encouraging trends away from the more traditional and more sterile questions regarding identification, acceleration and grouping. One current emphasis seems to be on exploring the nature of creative thinking and the possibility of expanding the concept of superior intellectual ability itself.... Altogether, it has been an encouraging period [p. 38].

The overriding trend toward studies of cognitive factors and the phenomenon of creativity does not mean that no other concerns are being subjected to behavioral research analysis. On the contrary, the present review includes analyses of research on the use of instructional media with the gifted, teaching styles of thinking to the gifted, the effects of rewards with the gifted, the nature of early readers and the influence of early admissions, the impact of socioeconomic differences upon the gifted, underachievement, and characteristic traits of the highly gifted.

The Creativity Research

The creativity researcher faces many problems. Rhodes (1963) outlined (a) the semantic problem, (b) the concept of "newness" problem, (c) the time problem, and (d) the means of expression problem. He found 40 definitions of creativity and called attention to the fact that since 1935 the Supreme Court has held that creativity, as applied to patent cases, is "a mental concept." If a man can prove that an idea is his by demonstrating or providing evidence that only he has the knowledge from which a product is synthesized, he can claim patent to the invention.

For researchers, the concept of "newness" problem may be stated simply: "Just what is new?" Time confounds the creativity researcher who must consider what elapses from "the birth of an idea and its embodiment in form recognizable by someone or society as valuable [Rhodes, 1963, p. 477]." Research strategies are further dictated when one considers the problem of "the multitude of ways in which ideas can be expressed [Rhodes, 1963, p. 478]." The ever present criterion problem is presented thoroughly by White and Williams (1965).

The findings of research on creativity are indeed a function of each researcher's initial perspective. When creativity is equated with the self actualization process, "creativity is defined as a way of conducting one's life rather than in terms of the number and kinds of objects which one may have produced [Hallman, 1963, p. 132]." Creativity in such a view becomes the nebulous "stuff of becoming."

In contrast, one may plan research from a two kinds of intelligence perspective. Givens (1963) suggests that intelligence usually refers to the ability to deal with abstract concepts and adapt to new situations. He proposes that we think of two kinds of intelligence—adaptive and creative. Conclusions based upon research with a strikingly similar perspective (Getzels and Jackson, 1962) have been criticized roundly. Statistical analyses presented by Marsh (1964) lead to the contrary generalization that creativity is not independent of the general factor of intelligence and "the conventional IQ is still the best single criterion for creative potential." Admittedly, the IQ as a predictor could be improved.

In the same month that Marsh published his critique of the intelligence-creativity dichotomy, there was accepted for publication a report on divergent adolescents which found results "entirely consistent with those obtained by Getzels and Jackson [Clark, Veldman, Thorpe, 1965]." Cicirelli (1965) added that "creativity did not interact with IQ to boost achievement," while Schmadel (1965) concluded that children of high IQ "may be both gifted and creative."

The confusion documented above leads some to accept Kneller's (1966) conclusion that not much has changed in the area of creativity since Wallas published *The Art of Thought* in 1926. However, a most insightful commentary on present creativity research efforts has been offered by Joncich (1964), a social historian, whose observations will precede the thorough consideration of the work of Torrance, Wallach, and Kogan.

Joncich (1964) warns that "creativity is being defined (and researched) from the same kind of culture-bound presuppositions and biases so freely attributed to intelligence test makers." She charges that "historical and cultural myopia . . . are general among those who write about and conduct research in creativity [p. 135]." The historian notes that the terms intelligence and creativity, as used in contemporary research, are survivors and continuations of an historical tradition specific to the United States and are pertinent only for a modern, industrialized, urbanized, and science oriented society. Giftedness in other cultures might have the following attributes:

1. Ability to manipulate or control individuals and social situations with beneficial results to the position of the instigator.
2. Self discipline and the control of one's emotions, particularly under trying social and physical circumstances.
3. Skilled performance of the traditional arts and graces.
4. Beauty and correctness of figure, physical movements, speed, etc., as judged by age old criteria.
5. The charismatic ability of individuals.
6. Business acumen: sharp trading, cleverness, etc.

THE NATURE OF CREATIVITY AND ITS ENHANCEMENT AMONG THE GIFTED

The four studies presented in this section are quite different from each other. They represent theoretical as well as methodological differences. Individual differences in creative ability require careful documentation before school programs are revised drastically to accommodate these supposed differences. Meanwhile, recognized differences in creative productions are present in every classroom. Systematic attempts to differentiate creative ability from other dynamics, including behavior dynamics such as conformity, are as important as classroom studies which assess the effects of various teaching procedures on "creative" production. The following studies provide new evidence in these important areas.

Wallach, M., and Kogan, N. *Cognitive Orginality, Physiognomic Sensitivity, and Defensiveness in Children.* Durham: Duke University, 1965.

Purpose: To define a dimension of individual differences that involves the ability to produce many unique cognitive associates and to determine if this dimension is independent of individual differences in the traditional area of general intelligence. Confirmation of such an independent characteristic would allow one to apply the label creativity if the characteristic possessed a substantial degree of generality across task variations.

Subjects: The subjects throughout the studies conducted were 151 middle class (professional and managerial) fifth grade children from a suburban New England public school system. The sample was comprised of 70 boys and 81 girls. All subjects were Caucasian and were from predominantly Protestant family backgrounds.

Procedure: In addition to Wechsler Intelligence Scales for Children (WISC), School and College Ability Tests (SCAT), and Sequential Tests of Educational Progress (STEP), 17 separate nontest procedures were administered to the children by the experimenters. Creativity was explored through five of the 17 procedures which required the production of associations. Unique responses and the number of responses were recorded. All communication was oral. A unique response was one which no other subject offered. When summed, these responses became a uniqueness score. Measures included naming instances (e.g., all the things you can think of which are round), alternate uses (e.g., different ways you could use a newspaper), similarities (e.g., all the ways a potato and carrot are alike), pattern meanings (e.g., tell all the things you think this drawing could be), and line meanings (e.g., what does this line make you think of?).

Results: Whether examining results for the sample as a whole or separately for the 70 boys and 81 girls, the 10 creativity measures proved to be highly intercorrelated, the 10 intelligence measures employed proved to be highly intercorrelated, and the correlations between the creativity and the intelligence measures proved to be extremely low. A dimension of individual differences which is independent of the traditional notion of intelligence seems to have been defined. The new dimension concerns a child's ability to generate unique and plentiful associates in a generally task appropriate manner and in a relatively playful context.

Several studies followed in which four groups of children were defined—those high in both intelligence and creativity, those high in one ability and low in the other, and those low in both abilities. Differences were found in several personality traits and conceptual abilities, as well as in self concept and fantasy behavior.

Comment: To many educators the difference between the creativity of Wallach and Kogan and the creativity of Getzels and Jackson (1962) will seem obscure and unimportant. In view of the confusion outlined in the introductory review, the distinction is needed to enlighten and clarify the creativity issue.

Wallach and Kogan reason that the existence of a cognitive ability labeled creativity must be demonstrated on measures which not only exhibit low correlations with intelligence (IQ) measures but also exhibit high correlations among themselves. The creativity measures of Getzels and Jackson (1962), Torrance (1959, 1960), and Guilford (1967) do not generate higher correlations among themselves than they do with intelligence measures. Therefore, a unified dimension, creativity, is not actually demonstrated according to Wallach and Kogan. By defining creativity as the ability to generate unique and plentiful cognitive associations, the label creativity is "pinned down."

Now, we have statistically "clean" creativity models and statistically "muddy" creativity models. In the meantime teachers continue, in their words, "to develop the full potentialities of each child." Presumably, these potentialities include some concept of creativity. In all probability, teachers want neither a statistically clean nor muddy model, but merely a workable one.

Yamamoto, K. *Creative Thinking Abilities and Peer Conformity in Fifth Grade Children.* Kent, Ohio: Kent State University, 1965.

Purpose: To compare peer conforming behavior of high creative (creatively gifted) children with that of low creative children in a controlled, small group situation, taking into account the nature of the tasks presented and the sociometric composition of the group.

Subjects: All fifth grade pupils in a large, suburban public school district (47,922 population) were included in the initial sample. The target groups included students who belonged to the top and bottom tenths on creative thinking identified from scores on the Torrance Tests of Creative Thinking. Eighty-four students were in the high group, 82 in the low, and 661 remained in the middle creative group.

Procedure: Within each level of creative thinking, experimental subjects were randomly assigned to six combinations of the two variables of task (visual perception/information) and group composition (friend/neutral/nonfriend). Small groups of five members each, including one experimental subject and four middle creative pupils, were then presented with a series of multiple choice type tasks. The experimental subject faced a group pressure situation through prearranged manipulations. Responses of control subjects to the same tasks under no group pressure served as criteria. Shifts in the experimental subjects' judgments toward the alleged group consensus were recorded and analyzed.

Results: Significant differences among high and low creatives did occur but could be interpreted only by adding the most extreme qualifications. Three criterion measures of conformity were employed and, depending upon which criterion was employed, differences were quite varied and allowed no generalization across the three conformity conditions. The responses of the control subjects were handled indiscriminately in terms of level of creativity, with the result that it is not known how creativity level affected these responses.

The differences in task resulted in apparent differences in subject reactions. Perception tasks, being more ambiguous, tended to produce less confidence than information tasks, which appear more amenable to reason.

The nature of the group was an important variable. Differences in degree of deviation occurred when the experimental subjects were in groups with friends, neutrals, or nonfriends.

The choice of faked norm also was responsible for mixed results. Under conditions of too great a discrepancy between the faked norm and the subject's idea about the right response, group pressure may not only elicit resistance but even pressure toward nonconformity.

Comment: The investigator, in his suggestions for replication, outlined several reservations which this reviewer shares. First, the study was not conducted within the framework of any group behavior theory. Secondly, the hypotheses concerning creativity were not derived from an integrated personality viewpoint. Thirdly, levels of conformity, such as thinking and doing, were not differentiated: nonconformist thinkers may not be nonconformist in social behavior. Fourthly, further inquiry into the process of conforming behavior is needed. Conforming behavior in this study has been cast in the role of being undesirable. It is pointed out that creative behaviors need not always be the antitheses of conforming acts.

Torrance, E. P. External Evaluation and Creative Thinking. In E. P. Torrance, *Rewarding Creative Behavior: Experiments in Classroom Behavior*. Englewood Cliffs: Prentice-Hall, 1965. Pp. 131-172.

Purpose: To determine the effects of differential rewards on creative thinking, the effects of intelligent teacher evaluation and no evaluation on creative behavior, and the effects of peer evaluation on originality and elaboration.

Subjects: Four sixth grade classrooms were involved in the study of differential reward. The subjects in the other two studies were drawn from the entire student populations of selected elementary schools in Minnesota.

Procedure: The procedures used by Torrance are similar enough to be described together. In studying the effects of differential rewards, teachers offered children a $2.00 prize for stories which, under condition A, had correct spelling, punctuation, grammar, neatness, correct margins, indentations, and handwriting and which, under condition B, were the most interesting, exciting, unusual, and original. The effects of intelligent evaluation were studied in experimental conditions following practice periods during which some children received no evaluation and some children received appropriate direction and suggestions.

Two peer evaluation conditions, critical and creative, were developed in practice sessions in the third experiment. Critical evaluation was encouraged by asking students to point out "things that were wrong" with others' products, while creative evaluation occurred as students were urged to suggest possibilities for making products more unusual, interesting, complete, or elaborate.

Results: Not surprisingly, children were found to achieve best along those lines for which they were rewarded. When rewarded for correctness, children produced fewer errors. Under the condition of primary reward for original and interesting work, children produced significantly higher ratings on those qualities. Instructions emphasizing rewards for correctness or quantity with secondary attention to originality appear to work against the production of original ideas.

Concerning the effects of evaluation and nonevaluation, the central hypothesis that performance related to nonevaluative practice would exhibit a higher degree of creative qualities was supported in samples of younger children but not among fifth and sixth grade children. Younger children seemed to be more affected by adult evaluation than did older children.

The differences between total group performance under critical and creative peer evaluations were not significant beyond the .10 level. However, the high number of differences at the .10 level may be interpreted as strong evidence supporting the creative peer evaluation condition. The creative peer evaluation condition produced especially noticeable differences at grades four, five, and six.

Comment: Torrance describes some of the studies presented as "modest experimental studies" in which "every effort was exerted to follow as rigorous procedures as possible." Accepting this description as a delimitation regarding generalizations drawn from these studies, one must still consider the research described as extremely important. In spite of the complexity and contamination of live classroom research, the behavior of classroom teachers is not likely to change until experimental treatments are translated into realistic classroom behaviors. These translations are being accomplished by Torrance and his associates.

As for Torrance's findings, the reader is compelled to ask the following questions: Are the creative behaviors encouraged by Torrance equally important in all types of creative performance? Should creative behaviors at all ages be described along the same dimensions? Can external evaluation be defined accurately in the absence of data related to students' past experience and "locus of control?" How can developmental characteristics be incorporated more fully in interpreting peer evaluation, adult-student interaction, and other interactions with creativity? If IQ were held constant, would the conclusions remain the same for all levels of ability?

The research selected for this review has not involved gifted children exclusively. However, similar procedures and purposes are so often employed with the gifted that presentation of some basic examples was considered appropriate.

Martinson, Ruth A., and Seagoe, May V. *The Abilities of Young Children.* Washington: The Council for Exceptional Children, 1967.

Purpose: To investigate a method of assessing the work of gifted (high IQ) and nongifted children across a variety of fields including art, music, writing, social studies, and science, and to compare these judgments with measures of creative thinking.

Subjects: Participating students included those in five ungraded classes whose chronological ages were those normally found in grades three through six. Two groups were differentiated—a high IQ group including 49 pupils who scored above 130 on the Stanford Binet (mean = 142.7), and an average IQ group including 57 students who scored between 85 and 115 on the Stanford Binet (mean = 107.5).

Procedure: The performance of the high and low groups on Guilford Tests of Divergent Thinking produced one set of data for analysis. Judges' scores on creative products yielded the second set of data. Statistical analyses were made between IQ and Guilford Tests and between IQ and judges' ratings. Differences between the two IQ groups were also analyzed for statistical significance and for educational implications. Judges rated the following products for creativity on a nine point scale: for science, recorded ideas in response to unsolved problems; for writing, a poem written without time limitation and a response to topic "It Couldn't Happen;" for social studies, a response to problem of ideals based on a view of Utopia and a response to problem involving the survival of man; for music, films of children performing interpretive rhythms (two for each); and for art, paintings and clay objects.

Results: The performance of high and low IQ groups on tests of divergent thinking produced only one significant difference. The scores were so similar throughout that the investigators concluded that the divergent test functions are apparently quite different from those of the individual intelligence test.

Interjudge reliability for various products was extremely mixed, ranging from .95 in judging clay products to .14 in judging poetry. Several factors contributed to this variability, including lack of training, lack of agreement concerning the creativity related terms, and variety in the products themselves.

The results of chi square analysis of judges' mean ratings of products (high and low) with Binet IQ (high and low groups) were significant at the .05 level in five of the eight areas judged. Differences favoring the gifted group were found in poetry, story writing, social studies (Utopia), science problems, and rhythms. No differences were found in survival ideas (social studies), clay products, and painting.

Comment: While this study attempts to introduce more sophistication into the matter of school evaluation of the gifted, more questions are raised than are resolved. The methodology poses some severe limitations on interpretation, but the investigators are aware of this. The problem of measured creativity versus acknowledged creative productions is highlighted, since children's products were closely related to IQ scores while tests of divergence were unrelated to IQ scores. One wonders whether similar results would occur with a "clean" model of creativity (see discussion of Wallach and Kogan research). The use of rating scales to judge consistently the creative products of children has not been effectively demonstrated in this study. However, an awareness of the criteria used should sensitize teachers to products which are highly original and worthy of reward.

EDUCATING THE GIFTED FOR MORE PRODUCTIVE, EVALUATIVE, ARTISTIC, AND HUMANISTIC STYLES OF THINKING

The advent of administrative changes such as nongraded schools, continuous progress programs, enrichment centers, and team teaching arrangements has demonstrated the depressing effect which "lockstep" thinking has exerted on the curriculum. Now that schools wish to encourage individualized and nongraded experiences, few educators seem to know how these experiences could or ought to be different from graded, group oriented curricular experiences. For gifted youth, the absence of curricular innovation based upon knowledge of giftedness results in more of the same under new labels.

The studies selected for this section exemplify the exciting research oriented curricular changes which are evolving in studies with gifted learners. The emphasis on the structure and styles of thinking is emerging as equally important as the structure of knowledge in planning experiences in traditional school subjects.

Parnes, S. J. *Programming Creative Behavior*. Buffalo: New York State University, 1966.

Purpose: To determine whether subjects receiving creative problem solving training by autoinstructional materials alone show significant increases in creative ability. A further purpose was to study the attitudes of students toward a programed version of a creative problem solving course.

Subjects: Three groups of 62 subjects each were selected from among high school seniors who expected to continue their formal education after graduation. Selection was random, but restricted to 1,086 who requested inclusion in the experiment. The groups were matched on the basis of the Lorge-Thorndike IQ. Groups were identified as (a) control, (b) program alone, and (c) program with instructor.

Procedure: The critical variable in this study was a set of five programed texts which had been developed over two years of experimental analysis. Programs were organized in orientation, observation, manipulation, and evaluation phases.

Eleven pretests were administered to each group. The course was then offered over a 13 week period with two sessions each week. Students met in classes during study periods and were required to perform no outside work. Posttests were given during two posttreatment sessions. Six schools were involved in order to "eliminate discussion between groups and to minimize possible replication error."

Results: Both groups of experimental subjects made greater gains on creativity measures than did the control subjects. However, the instructor-taught students were significantly superior both to students who had the program alone and to the controls. Instructor-led students found the course more interesting but both experimental groups reported equal application of what they had learned.

Comment: The demand for educational programs especially suited for gifted college bound young people is no less than the demand for new materials fostering creativity among children. Ignoring the creative-noncreative problem solving distinction momentarily, one can only praise efforts to develop systematic programs based upon clearly specified behavioral goals. A creative problem solving program is, no doubt, superior to an ill defined classroom attempt to "promote creative thinking." Analyzing the effectiveness of materials with the gifted, using a sound experimental design, is also an exemplary practice.

In the context of other research reported, two questions are important to consider. Do the creativity measures used to support the value of the problem solving program reported identify two distinct groups of problem solving abilities (i.e., the creative and the noncreative)? Are creative problem solvers more effective in their pursuit of personal and occupational goals than noncreative problem solvers? In the absence of data other than self reports relative to this concern, one might ask whether creative problem solvers have merely learned strategies which enhance scores on creativity type measures.

Hauck, Barbara B. A Comparison of Gains in Evaluation Ability Between Gifted and Non-gifted Students. *Gifted Child Quarterly*, 1967, *11*, 166-171.

Purpose: To demonstrate the influence which appropriately selected classroom tasks and methods can exert on the evaluation abilities of gifted and nongifted children.

Subjects: Two separate studies are reported. The first involves matched experimental and control groups of gifted sixth grade students (mean IQ = 151, with range of 135-174). The second study involves matched groups of fifth grade students in a heterogeneous public school setting. In each case subjects were matched on age, sex, IQ, socioeconomic status, race, and pretest scores (five semantic evaluation tests).

Procedure: Eighteen classroom lessons designed to stimulate evaluative thinking were developed incorporating the psychological concept of mental set and a stratagem derived from game model theory. Lessons were of 30 minutes duration and employed a third feature, feedback, in the specified procedures.

Students mentally assumed an evaluator role each day (secretary evaluating a speech for his employer, policeman evaluating aspects of situations involving crime, etc.), completed seatwork tasks, and participated in group activities. Teacher feedback was continuously directed toward thinking processes being employed rather than toward responses or products of thinking.

Results: Analyses of pretest, posttest, and followup test (30 day interval) scores indicate that "evaluation abilities of gifted and nongifted children can be significantly improved by lessons based upon evaluative thinking factors [p. 171]." Significant gains were maintained and increased over a 30 day followup period during which students received no special instruction. This finding suggests that, once understood, styles of thinking and problem solving approaches are employed by children without special cues.

Comment: The clichés "teaching children to think" or "learning how to learn" acquire new and important meaning when research demonstrates specific gains in certain thinking abilities. Remembering the inadequacy of experimental tests of cognitive factors and the limitations associated with small samples and short treatments, one must still be encouraged by practical educational treatments which are "intellect oriented" rather than "content oriented." New instructional media and materials will be strengthened by incorporating research derived structure of knowledge *and* structure of intellect components.

Beittel, K. R. Instructional Media for Creativity in the Arts. In C. Taylor (Editor), *Instructional Media and Creativity.* New York: Wiley, 1966. Pp. 277-307.

Purpose: To determine the effect of delayed photographic process feedback and self discovered evaluative criteria on art activity and students' learning strategies in art. Theoretically, the self reflective phase in art activity is the only one in which learning in art can be influenced without violating the privacy of the art dialogue.

Subjects: Forty-eight college freshmen and 48 college junior art majors.

Procedure: Students were involved in a four week experiment requiring a 75 minute period each week. The experimental condition was a relatively invariant setting (same time, same medium, same stimulus, and procedural constants such as an evaluation form) in a value neutral field (i.e., absence of external approval or disapproval, no grades, acceptance of subject as having "unconditional worth," entertaining all products, and congruence). While students worked, their pictures (stimulus being a single, complexly constructed still life) were photographed every three minutes (i.e., process shorts). The completed works were photographed at the end of the period. Process feedback and evaluation of products were clearly separated from studio sessions. Thus the activity phase and the self reflective phase of learning in art were distinct.

Results: Changes in art strategies were attributed to practice, feedback, and internal system changes more than to treatment variables. Gains on eight personality measures and art gains were associated with the experimental self reflective learning conditions.

Comment: Although the research outlined here demonstrates a marriage of theory to media, the reviewer concurs with Beittel, who says, "more theory and less gadgetry is the urgent need." The potential uses of new media for the gifted excite the imagination. However, the clever use of TV and photographic devices to force the perception of naive students improved the work of the poorer students only. According to Beittel "the most gifted students did better work outside class altogether." In short, media can be harnessed in terms of their rich potential for instruction, but they get results which "are more spectacular than fundamental."

Drews, Elizabeth M. A Cosmic Approach to Counseling and Curriculum. *The Creative Intellectual Style in Gifted Adolescents* (Report II). East Lansing: Michigan State University, 1965.

Purpose: To increase (over a five year period) motivation to learn; resistance to conformity pressures; openness to psychological growth, to new experiences, and to humanitarian-altruistic attitudes; and to reduce prejudice, dogmatism, and rigidity in gifted children. This study follows 10 years of research with intellectually gifted adolescents, the past six of which have centered upon the creative intellectual style in particular.

Subjects: The study involved 243 academically talented ninth graders who were chosen on the basis of their ability to read at eleventh grade level or higher.

Procedure: Ten half-hour films (The Being and Becoming Film Series) were produced which dealt with the life styles and value systems of creative and socially concerned adult prototypes. The film series was augmented by a flexible anthology (The Four Worlds Textbook) which introduced the students not only to a wide range of heroes but also to significant ideas and crucial issues. The natural, aesthetic, technological, and human worlds were introduced.

Classes for the experimental group met 50 minutes a day for a semester. The control group was given a traditional career guidance course.

Measures used to identify the creative intellectual style included the Omnibus Personality Inventory, Allport-Vernon-Lindzey Study of Values, ACE Critical Thinking Test, Rokeach Dogmatism Scale, and Rigidity Scale. Several informal instruments were used including Student Interest Survey Scales, the Reasons for Occupational Choice, the Student Profile Check, and the Ability Self-Concept rating.

Results: Eleven posttests were administered with the following results. Experimental students scored significantly higher than the controls on the Originality, Thinking Introversion, and Theoretical Orientation scales of the Omnibus Personality Inventory, and higher (but not significantly) on the Estheticism and Complexity scales. The experimental group scored higher on the Theoretical scale of the Allport-Vernon-Lindzey Study of Values but not on the Aesthetic scale of the same test. They also scored significantly higher on the ACE Critical Thinking Test and the Creative Intellectual scale and checked more creative intellectual reasons for choice of a future occupation on the Reasons for Occupation Choice.

In short, attitude change in the direction of greater motivation to learn, more openness to psychological growth, and a general social concern were demonstrated. Such an interpretation requires an acceptance of the self actualization construct and its inherent character.

Comment: The importance of setting unique educational objectives for gifted youth is all but forgotten in school programs. The present research is a sparkling exception to the myriad efforts to demonstrate gains in achievement, school performance, or scores on creativity tests.

While some would find fault with the assumptions or point of view upon which goals were established in this study, one must recognize the important contribution substantiated by the data collected—that personality and attitude changes may be influenced when the following specified conditions are met:

1. Materials and methods are harmonious with each other and themes limited in number.
2. Program aims are clearly delineated and introduced repeatedly.
3. Environment and materials are friendly and nonthreatening thereby fostering disagreement and controversy without hostility.
4. The direction of change is congruent with the students' predilections both in cognitive and affective areas.

SOCIOECONOMIC STATUS, RACE, AND GIFTEDNESS

A child's performance on measures of intelligence, achievement, temperament, and virtually all factors related to school success is affected significantly by the socioeconomic circumstances in which he lives. Upper status children are considered to be advantaged while lower status children are called disadvantaged. Research suggests that the performance of the advantaged child tends to be enhanced by his socioeconomic circumstances, while the performance of the disadvantaged child tends to be depressed. Until recently little research attention was directed toward that peculiar combination, the disadvantaged gifted child.

That disadvantaged children could perform as gifted children on measures of intelligence has been well established by anecdotes, but how such children would perform on measures of creativity, interest, achievement, and personality has not been so well established. The following two studies add new information in this area.

Smith, R. M. *The Relationship of Creativity to Social Class.* US Office of Education Cooperative Research Project Report Number 2250; Contract OE 4.10.070. Pittsburgh: University of Pittsburgh, 1965.

Purpose: To study intensively the relationship between the responses of public school fifth grade children to tests evaluating factors of creative thought, and the socioeconomic situation with which each child was associated, and to clarify the relationships between creativity and other variables such as intellectual ability and achievement. A secondary purpose was to determine on which creativity factors gifted children differed from average children when different variables of possible influence were controlled.

Subjects: A total of 359 Negro and 244 white children from either lower or middle socioeconomic sections of Pittsburgh participated in the study. The socioeconomic variables of concern were (a) occupation of head of household, (b) source of income, (c) dwelling area, and (d) house type. Scores from the Kuhlmann-Anderson Intelligence Test and the Metropolitan Achievement Test were available for each child. An interesting subsample ($N = 36$) was identified and labeled as coming from entrepreneurial homes on the basis that the fathers "worked for themselves." Each of these subjects was matched (IQ, achievement, sex, and race) with a subject whose father worked for someone else associated with a major business concern. The latter were labeled as coming from bureaucratic homes.

Procedure: The independent variables in this study were race, sex, and socioeconomic position. Intelligence and average achievement were covariates. The 604 subjects were administered paper and pencil tests considered to be measures of creative thought. (Tests included were word fluency, ideational fluency, associational fluency, unusual uses, consequences, making objects and circles, and seeing problems.) All of the scores on the creativity tests were considered as dependent variables. The data were analyzed for each dependent variable using a two way analysis of covariance procedure, separately covarying intelligence and average achievement for the Negro subjects and the white subjects independently.

As a supplement to the major analysis, all of the subjects who had scored above 120 on the Kuhlmann-Anderson Intelligence Test were matched with an intellectually average child (IQ range of 90 to 120) on the basis of sex, race, and socioeconomic situation and according to the school and the classroom. A total of 60 subjects, 26 male and 34 female, had scored above 120 IQ.

Results: Two general hypotheses were tested in this study:

H_1—Children from lower class families will differ significantly from children associated with middle class homes in both their verbal and nonverbal creative productions.

H_2—Irrespective of social class, children who are from homes in which the father is engaged in a business of a "risk taking" nature will be more creative than children from homes where the father is working for someone else.

Hypotheses related to the gifted subjects might be stated as:

H_1—Gifted children will differ significantly from average children on a majority of creativity variables, particularly those involving verbal responses.

H_2—Females will differ significantly from males in their creative responses (i.e., gifted females will be superior, and average males will be the least creative of the four groups).

Among white subjects, the first hypothesis was supported. Children from higher socioeconomic circumstances scored above those subjects in the lower socioeconomic levels on several of the creativity variables, all of which involved verbal responses. With IQ covaried, the lower socioeconomic subjects scored better (though not significantly) than higher socioeconomic subjects on nonverbal creativity factors.

None of the analyses indicated significant differences between middle and lower class Negro subjects. This is itself significant, particularly since a number of differences between the various socioeconomic levels were noticed with the white subjects, and of special interest in light of the fact that both groups were assigned to socioeconomic levels using the same criteria.

The second general hypothesis was not supported. No differences were found to exist between children from entrepreneurial and bureaucratic homes. Males in this subsample were significantly superior to females on total creativity score, which is a perplexing finding since it contradicts the general superiority exhibited by females in the total study. Smith suggests that these subjects constituted a sample of a unique population of subjects, but the influence of the family's occupational orientation did not occur as predicted.

The gifted subjects exceeded the normal subjects on eight of the 14 verbal creativity variables (creativity variables were grouped under eight test or factor names) at or beyond the .05 level of significance. None of the seven nonverbal factors yielded a significant group difference. Controlling for intelligence erased all of the differences except the trend (.10 level) related to the total creativity score.

Separate analyses were carried out with mental age, chronological age, and achievement covaried. When all three were covaried together, the only variable on which any differences occurred was on the Obvious Consequences score—a difference favoring the normal subjects at the .10 level.

Seventeen of 154 separate analyses related to interaction of males and females were significant at .10 level or beyond. Twelve of the 17 scores were in the areas directly related to nonverbal creative thought. In the area of nonverbal flexibility, the gifted females were consistently superior to all other groups irrespective of the variable statistically controlled. The gifted males were the lowest of the four groups on this factor. In nonverbal fluency, the normal males were consistently superior irrespective of the statistical control used, followed by the gifted females, normal females, and the gifted males. The remaining variables on which differences were noted were significant at the .10 level.

Comment: Creativity is not a single factor, and neither is low socioeconomic status a single condition. The danger inherent in the use of these terms as norms is apparent from this study. Whatever processes lie behind the creativity variables presented in this study, they operate differently within individuals when the outcome is verbal rather than nonverbal. As a result, upper status white children are more efficient when a verbal product is expected, and lower status white children are more efficient when the product is nonverbal. The explanation for this difference, however, does not lie entirely in socioeconomic influences since Negro children did not exhibit differences associated with socioeconomic status. One must speculate about caste influences rather than class influences in view of this evidence.

The study supports the continued stereotyping of middle and lower class family value systems. Child rearing practices and parent child relationships, which are substantially different across the classes, can be reasonably identified as influencing differences among the white sample. In addition, serious attention must be given to the possibility that a caste system, no matter how subtle, often will control norms and mores (and thus, behavior) in a more dramatic way than will a class system. Although classes exist within castes, the latter may exert a stronger influence in terms of a style of life or, in the case of creativity, a style of thinking.

Differences in creativity between Negro subjects and white subjects were significant. No satisfactory explanation is suggested, although the disproportionate number of subjects in the lowest and highest socioeconomic classes exaggerated the differences when comparisons were made across total racial groups. Further analyses of family dynamics are essential if this finding is to be examined in nonracial terms.

Since no differences were found to exist between gifted and nongifted groups on nonverbal creativity factors, the influence of class status was again supported. Due to the fact that the gifted sample represented a more middle than lower class group, nonverbal creativity would appear to vary more between groups than within a given class group.

The most important observation, however, is related to the effect which statistical control of certain variables has upon the differences seen in the dependent variables. Wide discrepancies occurred in specific creativity scores when one or several influential variables (e.g., age, mental age) were controlled. The obvious implication is that when studies report conclusions on the basis of total creativity scores only, a great possibility of error in both directions may exist.

Frierson, E. C. Upper and Lower Status Gifted Children: A Study of Differences. *Exceptional Children,* 1965, *32,* 83-90.

Purpose: To examine the extent to which gifted children of lower socioeconomic backgrounds differ from gifted children of upper socioeconomic backgrounds in interests, activities, personality traits, creativity scores, stature, school achievement, and other selected traits, and to determine those characteristics which differentiate groups of upper and lower status children regardless of their intellectual ability.

Subjects: The samples were drawn from schools which served communities (in adjacent census tracts) defined as upper and lower socioeconomically (upper and lower three deciles on Shevky-Bell Index of Social Rank). All Major Work classes (for children of IQ 125 and above) in these schools were involved in the data collection, along with corresponding regular classes. From the 572 students screened, 111 (including 56 Major Work students) were identified from lower socioeconomic backgrounds. One hundred seventy-four students were identified from upper socioeconomic backgrounds (including 88 Major Work students).

Four groups were delineated:

1. Upper socioeconomic—Gifted (mean 133.2, $N = 88$).
2. Lower socioeconomic—Gifted (mean 132.1, $N = 56$).
3. Upper socioeconomic—Average (mean 102.9, $N = 86$).
4. Lower socioeconomic—Average (mean 96.8, $N = 55$).

Procedure: Data were collected from all subjects on height and weight, IPAT Children's Personality Questionnaire, Minnesota Tests of Creative Thinking, Interest Inventory Record, and school records.

Results: Height and weight data indicate that the gifted tend to be superior (differences not significant at .05 level) to the nongifted, regardless of status. In interests and activities, upper status gifted differed from lower status gifted in the quantity and quality of their reading, in their awareness of parental aspirations for college attendance, in their positive attitudes toward school, and in their somewhat lower preference for competitive team sports. Lower status gifted children differed significantly from lower status average children on 13 interest and activity responses.

The personality patterns of upper status gifted children and lower status gifted children were more similar than were personality patterns of lower status gifted and average children. On measures of creative thinking, the upper status gifted group was somewhat superior to the lower status gifted group. It was found, however, that some of the factors contributing to variability in creativity among gifted children were socioeconomically oriented.

Comment: Differences among high IQ children are undoubtedly as important for instruction as are differences between high IQ children and average children. This study is especially optimistic because the effects of a disadvantaged background seem to have been partially counteracted by a special school program based exclusively on unusual learning ability. Lower class children identified as gifted and placed in a special program by the second grade were, in the upper grades, markedly different in achievement, attitude, and aspirations from their companions.

Expecting lower class gifted children to be like upper class gifted children is unrealistic and unfair. However, there is evidence that experimental animals perform better when research trainees are given information which increases the trainees' performance expectancy. Would the learning of many bright lower class children be improved similarly if teachers believed they had been nominated and qualified for a "major work" experience?

EARLY CHILDHOOD GIFTEDNESS AND THE EARLY ADMISSION POLICY

The revival of Montessori, the creation of Project Head Start, and continuing evidence from experimental psychology are dramatizing the influence of early life experiences in shaping cognitive abilities. Yet, amid the clamor for early enrichment for all children, the phenomenon of spontaneous onset of remarkable learning continues to be little understood or accommodated in the typical home or school.

The gifted child who learns to read without being taught is often considered a freak. Warnings against irregular school admissions or rapid school advancement are freely advanced by physicians and educators in spite of an accumulating body of research which supports both practices. Two studies that add important data to the literature on the very young child are now presented.

Durkin, Delores. Children Who Read before Grade 1. *Elementary School Journal*, 1963, *64*, 143-148.

Purpose: To determine the characteristics of preschool readers and delineate the causes and conditions which are associated with early reading.

Subjects: Two samples are reported in the Durkin study: (a) from among all children who entered the Oakland, California schools, 49 who had the ability to read; and (b) from among 4,465 first graders screened in New York, 180 children in 35 schools who were identified as readers. The criterion for inclusion was the ability to identify at least 18 words from a list of 37. Following the administration of the Gates Primary Word Recognition Test and Gates Primary Paragraph Reading Test, 23 of the 180 New York children were excluded from the study because they were unable to score on the Paragraph Reading Test.

Procedure: The Oakland sample was given the Stanford-Binet Intelligence Test, and each family represented was interviewed. Reading tests were administered twice a year, and informal family and school data were recorded.

The New York portion of the study added a matched group

($N = 30$) of nonreaders for whom the same information was obtained. Thus, reading gains could be compared from the beginning of school through the end of the second grade.

Results: The Oakland early readers were from predominantly blue collar homes. Only 14 percent were from professional level families. The range of intelligence among these readers was 91 to 161. The early readers were described as persistent, perfectionistic, eager to keep up with older siblings, curious, possessed of good memories, and "paper and pencil" children who love to draw and scribble.

The New York early readers ranged in IQ from 82 to 170 with a mean IQ of 133. The reading range was 1.4 to 5.2 with a median of 2.0. At the end of one school year, the 30 early readers matched with 30 nonreaders had gained two additional years in reading. However, nonreaders of comparable ability gained three years during their first year in school. The median IQ of the matched groups was 132.

When compared with the nonreaders, early readers were found to:

1. Have mothers of higher education levels.
2. Walk and talk earlier.
3. Come from smaller families.
4. Have older siblings closer in age.
5. Watch fewer hours of TV.
6. Be more content with quiet activities.
7. Enjoy playing alone.
8. Have parents who helped in reading instruction.

Several persisting beliefs were not supported. Preschool readers were found in varied, not common, backgrounds; they were found *not* to have problems with school reading programs, rather than to experience problems; and the need to define parents' roles as educators was demonstrated as essential rather than reduced in importance.

Comment: Forty-five years ago Terman (1925) reported that nearly half of the gifted children (IQ 140) in his study had learned to read before coming to school. Hollingworth (1942) later observed that such children waste one half their time in school. Is this still true today?

Little attention has been focused on the early reader of average and low average IQ. Studies of readers at the upper elementary level indicate that by the time the child has reached age 10, his reading achievement is more highly correlated with his IQ than with the age he began to read. Is this a function of test similarity, natural regression, or inadequate instruction?

The absence of a differentiated instructional program at the primary school level (grades 1 to 3) in any school system is not defensible in view of the data presented in this study. Groupings on the basis of IQ alone are obviously inadequate. Graded reading series cannot meet the learning demands of all first grade children. Perhaps no stronger evidence has been presented for dismissing the concept of first grade readiness for school. Our question about the six year old child should not be, "Is the child ready for first grade?" but, rather, "What is the child ready for?"

Birch, J. W., Tisdall, W. J., Barney, W. D., and Marks, C. *A Field Demonstration of the Effectiveness and Feasibility of Early Admission to School for Mentally Advanced Children.* Pittsburgh: University of Pittsburgh, 1965.

Purpose: To determine the suitability of early admission and to compare early admitted children with equally bright regularly admitted children.

Subjects: All children in Warren, Pennsylvania (population 14,505) between the ages of 3-9 and 4-8 were eligible for inclusion in the study. Identification was made while potential subjects were between ages 2-9 and 3-8. Final selection was based upon the following minimum criteria: intelligence test quotient above 130, social maturity one year above standard, well developed personality (subjective evaluation), and nonlimiting physical characteristics. A total of 36 children was actually admitted early during the three year experimental period.

It was found that 53 normally entering children had IQ's over 125. Control subjects were selected from among this group.

Procedure: Data were collected relative to the following:

1. Identifying information.
2. Reading readiness.
3. Performance on an achievement test.
4. Social maturity.
5. Sociometric scores.
6. Stanford-Binet.
7. Goodenough Draw-a-Man Test.
8. Height and weight.
9. Developmental history.
10. School marks.
11. Emotional development rating.

Many questions related to the effectiveness of early admission were posed by the investigators. Procedures associated with the cost, personnel, community support, and so on are not included here. Two procedures are of special interest. First, sociometric analyses were used to compare the social development of the early entrants; second, academic achievement of early entrants was compared with that of classmates of similar ability.

Results: The results of sociometric comparisons were unequivocal. Early entrants could not be distinguished from the other children either in the way they perceived themselves or in the way they were perceived by the class.

Mean achievement in second grade as indicated by teacher marks on a five point scale showed no significant differences between early entrants and control group students when matched on IQ or mental age. A total of 12 early entrants remained in the Warren Project through three full years. When achievement comparisons were made with a group having the closest approximate match, no significant differences were reported (.01 level used). In all, 34 comparisons were made on standardized achievement measures. The comparison group was favored at the .05 level on two word knowledge tasks during first and second grade. Considered together, the conclusion was that early entrants are at no disadvantage in achievement in the primary grades when compared with regular entrants of like ability.

Comment: Sampling and comparability problems reduced the strength of the Warren Project conclusions, but in concert with overwhelming evidence (Reynolds, 1962), the results must be trusted. Judiciously selected, early entrants to regular school programs do not suffer socially or academically.

For the first time in this study a comparison was attempted between early admitted and regularly admitted gifted children. The expectancy of negative findings was thus heightened. Failure to find differences might strengthen two arguments: (a) gifted children should be admitted to school early because they are not "hurt" by such a procedure; and (b) gifted children should not be admitted to school early because no significant achievement gain is made over regularly admitted gifted children.

Perhaps the most important and unfortunate observation to be made is that whether or not a gifted child is admitted early, his achievement will reflect the nature of the instruction he receives, not his maximum potential.

THE HIGHLY GIFTED AND THE UNDERACHIEVING GIFTED

Intervention studies with gifted children and youth have involved high achieving, typically gifted children almost exclusively. The importance and need for intervention studies cannot be underestimated since intervention still remains the minority research strategy in the field. Yet, descriptive studies may spur more significant intervention research designs and treatments. In hopes that such inspiration will follow, two descriptive studies of unique samples are presented along with a report of an intervention with one of the groups described. It is especially significant that the studies chosen do not emphasize typically gifted nor high achieving gifted subjects.

Barbe, W. B. *One in a Thousand: A Comparative Study of Moderately and Highly Gifted Elementary School Children.* Columbus, Ohio: Department of Public Instruction, 1963.

Purpose: To study the characteristics of highly gifted and moderately gifted elementary school children and to determine whether significant differences exist in their personal adjustment, family background, and achievement.

Subjects: Thirty-five school psychologist interns in the state of Ohio nominated a total of 280 children as "the eight most capable children (potentially) in your school system." The criteria for two categories were established: moderately gifted, 120-134 Stanford-Binet IQ; highly gifted, 148 Stanford-Binet IQ or higher. The overall mean IQ of the highly gifted group was 158 and of the moderately gifted was 129.

The final sample, matched pairs of 65 highly gifted and 65 moderately gifted children, represented metropolitan, urban, and rural counties. The group contained 31 matched pairs of boys and 34 matched pairs of girls.

Procedure: All students contributed complete information of the following types: Stanford-Binet Intelligence Test, Iowa Every Pupil Tests of Basic Skills, IPAT Children's Personality Questionnaire, Parent's Rating of Child's Qualities, Who Is It? Sociometric Measure, autobiography, School Record, Index of Status Characteristics of Family and Home Information. In addition, an interview sample yielded information from a Personal Interview Questionnaire and the Minnesota Tests of Creative Thinking (1960 experimental form).

Admitted limitations of the study were outlined as follows: (a) no assurance that groups of "highly gifted" and "moderately gifted" are, in fact, representative; (b) the inadequacies in the measurement instruments when used with individuals who possess so high a level of intelligence; and (c) reliance upon so large a number of persons for collection of data increasing the possibility that differing procedures might occur.

Results: The general findings indicated that highly gifted subjects came from a more affluent background than did the moderately gifted, the educational level of their parents was higher, and in all other familial aspects the highly gifted group appeared to be favored. Both groups were from primarily Protestant backgrounds, were from small families, and tended to be the first born.

On school achievement tests, highly gifted subjects scored significantly higher than did moderately gifted subjects. No group differences were reported in the beginning age for learning to read. Autobiographies, analyzed for word and sentence usage, yielded slight but statistically insignificant differences favoring the highly gifted group. The highly gifted group obtained a significantly higher mean on four of five creativity scores.

A serious and disturbing finding was disclosed when individual IQ tests were contrasted with group IQ tests. A significant portion of the sample population scored below 120 (the cutoff for the study) and, had group tests been depended upon, the highly gifted group would have contained only 27 per cent of the same population.

When children from families of professional and managerial backgrounds were compared with children whose parents were in other categories, no differences were found. Such a finding does not support the concern of some that the physical superiority of the gifted is an artifact of high socioeconomic background.

The highly gifted group was reported to have more behavior irregularities than the moderately gifted group. The 14 factor personality questionnaire highlighted several trends but only one significant difference between groups. This difference (surgency) indicated that the moderately gifted group tended toward a more serious and less mercurial outlook.

A startling sociometric finding was the fact that 37 percent of the moderately gifted and 25 percent of the highly gifted were not mentioned by teachers in any of 10 categories on a pupil identification task (Who Is It?). Categories included: Who is the smartest? Who is the most talented? Who is the most imaginative? Who has the most academic potential? Who is the most intelligent?

A portrait of the highly gifted child is given along with educational implications and recommendations.

Comment: Descriptive research on gifted children predominated during the period from 1915 to 1955. Subsequently, intervention studies have become more popular. Gallagher (1964) characterized this trend in terms of the behavioral scientist who is being transformed from a mere observer to an active participant. Full status in the research community must be accorded to those who conceive and carry out both types of studies. The world is changing so rapidly that new descriptive studies must continuously serve as a stimulus for intervention studies. As long as some people "talk about gifted children as a natural resource like iron deposits or navigable rivers," researchers must continue to emphasize the uniqueness of each gifted child by describing him accurately in a contemporary frame of reference.

Raph, Jane B., Goldberg, Miriam L., and Passow, A. H. *Bright Underachievers.* New York: Teachers College Press, Columbia University, 1966.

Purpose: To determine, by the study of two schools—Evanston Township High School (Illinois) and Dewitt Clinton High School (New York)—the self perception, personal characteristics, and aspirations of underachieving high ability students, as well as those students' perceptions of academic life, school provisions, faculty attitudes, parental interests, and pressures. A further purpose was to experiment with specific curricular and administrative modifications which might serve to raise the achievement level of underachieving high ability students.

Subjects: Bright underachievers were identified as students whose lower IQ score on either of two intelligence tests was at least 125 and whose school grade average placed him at or below the average for the general student population. Bright achievers had a comparably high IQ but also had a school average which placed them in the upper 30 percent of the population. Overachievers were students whose IQ's were below the school median (115) but whose grades placed them on the honor roll. The final sample (Evanston) included 24 high achievers, 24 underachievers, and 13 overachievers. The Dewitt studies involved 227 underachieving boys and 100 high achieving boys.

Procedure: Only one intervention procedure is included in this review, the group guidance and study skills class at Dewitt High School. Two special progress classes ($N = 29$ in each class) were initiated. A third group ($N = 26$) were not involved and acted as a control group. Two high achieving groups were included for comparison purposes.

Results: No differences in grade averages were found among the three groups at the end of grade 10, grade 11, or grade 12. At the end of the tenth grade, the gap between the underachievers and the high achievers was greater than it had been at the beginning of the year or at midyear. On the New York State Regents Examinations no differences were found among the underachieving groups, nor did the groups differ on number of discharges, dropouts, transfers, failures, repeaters, or scholarship winners. The researchers conclude "the expectation that providing underachieving boys with a male teacher who could act as model, friend, guide and helper would produce upgrading effects on achievement did not materialize." The experiments "show little promise" if initiated at the high school level.

Comment: More depressing than the data was the lack of imagination in designing an experimental treatment for boys whose characteristics were so thoroughly described in the interview phase of the study.

THE TEACHER OF THE GIFTED AND HER CLASSROOM

Many authors have described the characteristics which teachers of the gifted ought to possess. These descriptions, often superhuman caricatures, have usually been dismissed as describing unrealistic and nonexistent persons. Yet, few will argue the point that the single most important variable in the educational attainment of the gifted is the teacher. Many great successful individuals, for example, single out a particular teacher as being responsible for their success.

Turning from the question, "What should the teacher of the gifted be?" we now focus attention on what the successful teacher of the gifted actually is. To know that successful teachers of gifted children exist and can serve as prototypes for our training, recruitment, and hiring policies is of little value without documentation. The studies reviewed make a limited contribution toward this end.

Bishop, W. E. Successful Teachers of the Gifted. *Exceptional Children,* 1968, *34,* 317-325.

Purpose: To determine the characteristics possessed by successful teachers of the gifted and to compare successful teachers with teachers not so identified.

Subjects: The target group of teachers was selected from among 181 teachers nominated by student participants in a state wide honors program for gifted adolescents. Teachers were nominated on the basis of 12 descriptive statements and were chosen by students as the teacher who "made the greatest difference" in the student's educational career. Included in the "successful" group were 109 teachers, while 97 teachers were in the nonselected group.

Procedure: Every teacher completed Ryan's Teacher Characteristics Schedule; selected teachers were interviewed and were administered the Wechsler Adult Intelligence Scales and the Edwards Personal Preference Schedule. College transcripts were obtained for each teacher.

Results: Successful teachers of the gifted did not differ from unidentified teachers in sex, marital status, type of undergraduate institution, highest degree held, coursework preparation, or professional organization affiliation.

Successful teachers were intellectually superior, ranking in the top 3 percent on adult population norms. They pursued "intellectual" avocations and were more active in the cultural life of their communities than were their colleagues. Successful teachers exhibited a higher need to achieve and to do their best, which was reflected in past scholastic achievement as well as in present teaching success. Their motives for becoming teachers were associated with desire for intellectual growth and identification with a good teacher. The successful teachers exhibited more favorable attitudes toward students and took a greater interest in student motives, feelings, and behaviors. These teachers were more considerate of student opinions in class. They were more systematic, orderly, and businesslike in their approach. The successful teachers exhibited more imagination and enthusiasm about their particular subject. They instilled interest and appreciation in students. Finally, these teachers supported special educational provisions for gifted students. A greater number of them preferred to teach a class of exceptionally bright students than did their fellow teachers.

Comment: The education of the gifted will be accomplished best when this research is applied systematically by administrators and teacher education programs. If this were to happen:

1. Administrators would select teachers with qualities common to the gifted group who also had a special interest in working with the gifted.
2. Institutions would develop training programs which would specifically prepare able young people to teach gifted high school students and perhaps attract more superior college students to the teaching profession.

Gallagher, J. J., Aschner, Mary J., and Jenné, W. *Productive Thinking of Gifted Children in Classroom Interaction.* Washington: The Council for Exceptional Children, 1967.

Purpose: To examine the relationship between the productive thought processes expressed by gifted children and their teachers and other variables such as attitudes, self concept, home background, and scores on measures of productive thinking.

Subjects: The participants were 176 high achieving, academically talented students whose chronological ages ranged from 12-5 to 14-6 with a verbal IQ range from 127.21 to 134.35.

Procedure: Five consecutive one hour class sessions were tape recorded in each of 12 classrooms. Two observers in the classrooms took additional notes. No attempt was made to modify the routine classroom studies.

Students were given tests measuring cognitive processes and personality and attitude variables. The Aschner-Gallagher Classification System was the instrument used to assess different types of cognitive behavior expressed in the classroom. A family questionnaire was also administered.

Statistical analyses were employed to identify those factors accounting for the greatest variance in the classroom. The target groups were compared with the total population to determine pattern deviations from chance expectation in classroom operation.

Results: Cognitive memory questions made up more than 50 percent of the questions asked by teachers. In some sessions, requests for divergent and evaluative thinking were entirely absent. Significant differences were noted among teachers both in the cognitive style, as represented in teacher statements, and in the type of questions asked. Teachers' performances varied significantly from day to day and even from class section to section when teaching identical concepts.

Sex differences were found in the degree of classroom expressiveness and general attitudes toward self and others. Boys showed more expressiveness and more confidence in their own abilities. This verbal superiority in the classroom was not reflected on written tests of cognitive ability, which suggests that the classroom differences were related to personality and attitudinal dimensions more than to general ability.

The IQ score among these gifted young people was not a significant variable. This was attributed to the narrow range inherent in the selected groups. Performance on divergent thinking tests was not related to classroom expressiveness, but was related to measures of self concept and attitude. In boys, good performance on divergent thinking tests seemed related to social independence and nonconformity, while in girls, such performance seemed more related to a total pattern of good academic performance and personal adjustment.

One conclusion seemed clearest. There was a close relationship between the type of questions that teachers asked and the pattern of thought expression observed in student responses. In other words, the character and style of verbal expression were mainly directed by the teacher.

Comment: The evidence mounts that intellectual productivity in school is directly related to the teacher's style, expectation, and response pattern. In order to teach gifted children effectively, teachers must be trained to recognize stylistic differences in thinking, to employ procedures which require a full range and depth of thinking abilities, and to reinforce appropriately the most desirable student expressions of productive thinking.

This study clearly reveals (a) the inadequacy of our models of intellect, (b) the weaknesses in devices used to assess classroom thinking, (c) the inconsistent relationships between cognitive and noncognitive factors affecting productivity, and (d) the inefficient use of teaching time as procedures and results are contrasted with stated objectives. The study also discloses the competencies we must expect of teachers of the gifted and the directions in training we must move to if we wish to develop full productivity among our most promising young people.

SUMMARY

The past three years have seen a research explosion in the area of creativity. Many of the creativity studies have not involved gifted (high IQ) samples. Whether or not there are creatively gifted persons distinct from high IQ gifted persons seems less important than the fact that research on exceptional ability is destroying the concept of giftedness as a fixed, unchanging potential described only by an IQ test.

The review presented has included an analysis of recent creativity research and has highlighted two important areas of concern—culture-bound concepts of creativity and investigators' biases in creativity research. A third issue found among the studies analyzed is the issue of "statistically clean" models of creativity contrasted with global, but "statistically muddy," models of creativity which are applicable to classroom settings.

Studies involving gifted persons were grouped in this review according to the following areas:

1. The Nature of Creativity and Its Enhancement.
2. Educating the Gifted for More Productive, Evaluative, and Humanistic Styles of Thinking.
3. Socioeconomic Status, Race, and Giftedness.

4. Early Childhood Giftedness and the Early Admission Policy.
5. The Highly Gifted and Underachieving Gifted.
6. The Teacher of the Gifted and Her Classroom.

The representative studies analyzed included both intervention and descriptive research efforts. The need for more theory (based, hopefully, upon the extensive descriptions) and imagination with less gadgetry in "treatments" was clearly seen. Applications of hard research for the benefit of gifted children in real life settings have not occurred generally. Therefore, while we can encourage parents and teachers to read research publications and apply the principles inferred, realistically, we can delay no longer in developing training programs and demonstration settings if we want research to assist gifted children to full development and satisfactory life adjustment.

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2

The Mentally Retarded

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The review of research presented in this chapter is a continuation of the reviews presented by Heber on the educable mentally retarded (EMR) and by Charney on the trainable mentally retarded (TMR) in *Behavioral Research on Exceptional Children* edited by Kirk and Weiner (1963). The purpose of this chapter is to present research studies which illustrate major trends in the field of mental retardation. Wherever possible, an attempt is made to indicate the educational implications of the research findings. Although the majority of the studies discussed in this chapter have been conducted with mentally retarded subjects, several studies using culturally disadvantaged and/or intellectually normal subjects have been included to point out research strategies or methodologies which may have promising application to the field of mental retardation.

Since this review is intentionally selective, the reader wishing a more comprehensive review of educational research with the mentally retarded is referred to Blackman and Heintz (1966), Guskin and Spicker (1968), Kirk (1964), McCarthy and Scheerenberger (1966), and Quay (1963). In addition, exhaustive reviews of behavioral research with the mentally retarded may be found in *Handbook of Mental Deficiency* (Ellis, 1963) and Volumes 1 through 3 of *International Review of Research in Mental Retardation* (Ellis, 1966a and b, 1968).

The studies included in this review are organized under the following topics:

1. Preschool interventions.
2. School interventions.
    a) Administrative arrangements.

b) School performance and curriculum modifications.
c) Variables associated with school performance.

3. Post school adjustment.

PRESCHOOL INTERVENTIONS

One of the major trends in the education of mentally retarded children has been the addition of preschool educational services for the EMR. The primary impetus for this trend has been provided by the Office of Economic Opportunity's Head Start program begun in the summer of 1965. Although designed for economically deprived children, this program is serving that vast majority of retarded children whose retarded intellectual functioning appears to be the result of cultural-familial, rather than that of organic, factors.

In this section, an attempt will be made to evaluate the direct influence of preschool programs on the cognitive, affective, and motoric development of retarded and/or culturally disadvantaged children. In addition, an evaluation will be made of the indirect influence of such programs on the school achievement of these children after school entrance.

Fouracre, M. H., Connor, Frances P., and Goldberg, I. I. The Effects of a Preschool Program upon Young Educable Mentally Retarded Children. US Office of Education Cooperative Research Program, Project No. 167. New York: Teachers College, Columbia University, 1962.

Purpose: To develop and evaluate curriculum materials and educational procedures for use by teachers of educable mentally retarded children between the ages of five and seven.

Subjects: Fifty-four experimental children with Binet IQ's of 39 through 73 (mean IQ 59), and CA's of 4-10 to 6-10 (mean CA 5-9); because of case finding difficulties, 28 children with Binet IQ's of 51 through 75 (mean IQ 65) and CA's of 7-0 to 9-0 (mean CA 8-0) were used as a comparison group. Subjects were recruited primarily through medical referral agencies. The majority of children had multiple handicaps, with organic impairments constituting the primary causes for the intellectual subnormality exhibited by the children.

Procedure: In each of four years, a group of 11 to 15 experimental children was provided a one year kindergarten program designed to increase intelligence; imaginative and creative expression; social, emotional, and motor development; and self help skills. With the exception of the last group, followup data were gathered three to one years after treatment for the first through third groups, respectively.

Results: No significant IQ changes as measured by the Stanford-Binet were obtained at the end of the treatment period or after the children entered school.

Comment: This study reinforces the findings of Kirk (1958) and Gallagher (1960) which indicated that only minimal intellectual gains can be expected from an intervention with organically impaired subjects. The study also points out the futility of seeking an educable retarded preschool population from medical referral agencies. It should be noted that the mean IQ score of the children used in the study was approximately 10 IQ points below the mean intellectual level of a typical group of community EMR children. It is, therefore, quite probable that the curriculum guide developed for this experiment, if found to be effective, is more appropriate for high trainable and organically impaired EMR children than for the cultural-familial EMR preschool children, who are more likely to be found in Head Start programs.

Blatt, B., and Garfunkel, F. A. Field Demonstration of the Effects of Nonautomated Responsive Environments on the Intellectual and Social Competence of Educable Mentally Retarded Children. US Office of Education Cooperative Research Program, Project No. D-014. Boston: Boston University, 1965.

For a summary of the above study see also:

Blatt, B. and Garfunkel, F. Educating Intelligence: Determinants of School Behavior of Disadvantaged Children. *Exceptional Children*, 1967, *33*, 601-608.

Purpose: To study the effects of nonautomated responsive environments on the intellectual and social competence of educable mentally retarded children. In addition, an attempt was made to determine whether or not a preschool intervention for lower class children would reduce the likelihood of such children developing intellectual and academic deficits.

Subjects: Fifty-nine preschool children (mean CA 3.2) residing in a deprived area characterized by high rates of delinquency, school dropouts, school failure, low occupational status of parents, and run down homes were divided into three groups by stratified random assignment, using Binet IQ, CA, and sex in the stratification. The groups were as follows:

1. Experimental preschool plus responsive environment (E_1): 18

children with mean Binet IQ of 92.6, mean CA of 3.2, and mean PPVT IQ of 77.0.

2. Experimental preschool (E_2): 20 children with mean Binet IQ of 92.6, mean CA of 3.2, and mean PPVT IQ of 79.0.
3. Home contrast: 21 children with mean Binet IQ of 89.2, mean CA of 3.2, and mean PPVT IQ of 74.9.

Procedure: Both E_1 and E_2 groups were exposed to a two year preschool curriculum designed to provide training in cognitive processes considered fundamental to acquisition of academic skills in the early grades; to help children learn to function socially in a group setting; and to arouse curiosity, promote inquisitiveness, and engender positive attitudes toward learning. In addition, E_1 children were provided 30 minute sessions daily on an electric typewriter using the responsive environment principles developed by O. K. Moore. The home control group was to receive no preschool treatment; however, since the majority of this group did in fact enter neighborhood preschool and kindergarten classes during the course of the study, the group was sufficiently contaminated to render it useless as a true control group.

Results: During the course of the investigation, the experimental and contrast groups had gained approximately seven IQ points on the Stanford-Binet. Analysis of the posttest cognitive, affective, and environmental data over the three year period indicated that there were no signficant differences among the three groups. In fact, in the words of the investigators, "... there was no more difference between the groups at the conclusion of the study than there had been at the beginning [Blatt and Garfunkel, 1967, p. 604]."

Comment: This study illustrates that not all economically deprived children require a specialized preschool intervention program to increase their intellectual functioning. The subjects selected for this investigation appear to have come from families often described as "middle class striving" or the "deserving poor." This observation seems to be supported by the facts that the (a) attrition rate of the subjects during the three years of the investigation was atypically small (one from an *N* of 60) for an urban, inner city population; (b) the majority of parents voluntarily visited the project school which was located approximately eight miles from their homes; and (c) the majority of the parents of the "at home" contrast group were sufficiently concerned about their children's welfare to enroll them in neighborhood preschool programs. These family characteristics, not unlike those of most middle class families, seem to indicate that the families of the study children were relatively stable and that the parents were concerned about the school behavior of their children. It seems reasonable to conclude that the children from such homes received sufficient motivation toward school success from their parents so that no unique educational intervention needed to be designed for them. The fact that the children attending traditional neighborhood preschool and kindergarten programs made cognitive and affective gains comparable to those of the children attending the experimental programs lends support to the above conclusion.

Weikart, D. P. Preliminary Results from a Longitudinal Study of Disadvantaged Preschool Children. In Council for Exceptional Children, *CEC Selected Convention Papers,* 1967. Pp. 161-170

Purpose: To assess the longitudinal effects of a preschool program designed to compensate for the mental retardation which is associated with cultural deprivation.

Subjects: In each of five years, a sample of approximately 26 children consisting of culturally deprived three year old Negroes diagnosed as educably mentally retarded were randomly placed into experimental and control groups of about 13 children in each. The initial mean Binet IQ for the experimental and control groups was approximately 79 each year.

Procedure: With the exception of a pilot group which received a one year preschool treatment at approximately CA 4, all experimental groups received a two year cognitively oriented preschool program. Home visits were made to involve the mothers in the educative process. Pre-, post-, and followup testing included measures of intelligence, language, and academic achievement.

Results: Since more followup data are available for the pilot group and because the performance of this group is similar to that of succeeding groups, only the results pertaining to the pilot group will be reported in this review.

Intelligence—Significantly greater Binet IQ gains were made by the experimental group following the one year intervention (78 to 91) than by the control group (75 to 82). By the end of kindergarten, the IQ differences between the groups were no longer significant, due to the slight drop in IQ by the experimental group and the slight gain in IQ by the control group.

Language—There were no significant differences between experimental and control group gains on the Illinois Test of Psycholinguistic Abilities or on the Peabody Picture Vocabulary Test.

Achievement—The experimental group significantly exceeded the control group in reading, arithmetic, and language skills (as measured by the California Achievement Tests at the end of first grade), and in reading and arithmetic at the end of second grade. However, the mean total achievement percentile ranks for the experimental group were only 22 and 18, while those of the control group were five and three at the end of first and second grades, respectively.

Personal and Social Adjustment—On the Pupil Behavior Inventory, the teachers rated the experimental children significantly higher than the control children in academic motivation in kindergarten, socio-emotional state in first grade, and personal behavior in second grade.

On the Ypsilanti Rating Scale completed by the classroom teachers, no significant differences between groups were observed in kindergarten or in first grade. However, the experimental children were rated significantly higher than the control children by second grade teachers on social development, verbal skill, and emotional adjustment. Despite the significantly better performance of the experimental children on standardized achievement tests, the teachers did not rate the experimental children significantly higher than the control children on academic potential.

Comment: Although by first grade there were no significant IQ or language differences between experimental and control children, it is interesting to note that the experimental children did significantly better than the control children on an academic achievement test. It appears, therefore, that the preschool intervention has had a positive effect on the achievement motivation of the children. Unfortunately, since the treatment included both home and school intervention, it is difficult to determine which of these factors, if any, influenced the achievement motivation of the experimental children.

It should further be noted that the academic achievement test scores of the "superior" experimental children were far below those of normal first and second grade children. This seems to indicate that improving the cognitive abilities of disadvantaged children does not insure school success. It is quite likely that these children will continue to have affective problems which interfere with school achievement.

Hodges, W. L., McCandless, B. R., and Spicker, H. H. The Effectiveness of a Diagnostic Curriculum for Preschool Psychosocially Deprived, Retarded Children. US Office of Education, Project No. 5-0350. Bloomington: Indiana University, 1967.

Purpose: To develop and assess the effectiveness of diagnostic curriculum strategies designed to remediate the cognitive, affective.

and motoric deficits exhibited by psychosocially deprived preschool children, and to prevent the progressive achievement decrements often exhibited by such children after school entrance.

Subjects: Subjects were 142 psychosocially deprived (lower lower class on Warner, Meeker, and Eels Index of Status Characteristics), five year old, Caucasian, mentally retarded children with Binet IQ's between 50 and 85. Children with neurological inpairments, severe emotional problems, or serious sensory impairments were excluded from the study. Over a three year period, 42 children were used as experimental subjects; 44 as kindergarten contrast subjects; and 56 as home contrast subjects. The initial mean Binet IQ's of the groups were 73.57, 75.27, and 74.18, respectively.

Procedure: In each of the three years of the study, children meeting the selection criteria were placed into either experimental (EPS), kindergarten contrast (KC), or at home contrast (AHC) groups, each containing approximately 15 children. The EPS group received a structured curriculum designed to remedy the specific diagnosed deficits of individual children in areas of language and motor development, concept formation, and socialization. The diagnoses were made on the basis of standardized tests and direct observations by the teachers and project staff. The KC group received curriculum experiences typically provided in traditional kindergarten programs. The AHC group received only pre- and posttesting.

Followup data through second grade are available for the first year groups and through first grade for the second year groups.

Results: The curriculum strategies were modified each year to incorporate the curriculum improvements suggested by the previous year's teacher. Therefore, the investigators have treated each year of intervention as a separate study. However, because of space limitations, the data on the three intervention years have been combined for the presentation of the pre- to posttest results. Since the school followup data for the first and second year groups differed significantly, the results from these data will be reported separately.

Intelligence—The posttest results from the Stanford-Binet showed that the EPS group was significantly superior to the KC and AHC groups, and that the KC group was significantly superior to the AHC group. The mean IQ gains during the intervention year for the combined EPS, KC, and AHC groups were 16.81, 12.27, and 4.09, respectively. Although the IQ scores of the EPS group remained relatively stable after one and two years of school attendance, those of the KC and AHC groups were highly variable. However, the latter groups made sufficient IQ gains after school entrance to wash out the significant differences which had existed among the groups at the conclusion of the intervention period.

Language Development—The Peabody Picture Vocabulary Test (PPVT) results indicated that the EPS group had made significantly greater improvement than the KC and AHC groups and that the KC group had made significantly greater improvement than the AHC group. The pre- to posttest PPVT IQ gains were 26.59, 14.64, and 10.12 for the collapsed EPS, KC, and AHC groups, respectively. After one year of school attendance, the differences among groups were no longer significant.

The results obtained from the Illinois Test of Psycholinguistic Abilities will be discussed separately under the Stearns' (1966) study.

Motor Development—The findings related to the motor development aspect of this study will be reported under the Lillie study.

Academic Achievement—Analysis of the achievement data derived from teacher ratings, school grades, and standardized achievement tests indicated that the school performance of the first and second year experimental groups differed markedly. Whereas both EPS groups had made comparable IQ gains which were significantly greater than those made by the KC and AHC groups during the intervention period, the first and second grade academic achievement among the first year study groups did not differ significantly. However, a comparison of the second year study groups indicated that the first grade academic achievement of the EPS group was significantly superior to that of the KC and AHC groups.

Personal and Social Adjustment—The personal and social adjustment of the first and second year EPS children was viewed by their first and second grade teachers to be significantly superior to that of the KC and AHC groups.

Comment: This study clearly demonstrates that specifically designed curriculum strategies are more effective in improving the cognitive abilities of severely disadvantaged children than the more general approaches used in most traditional kindergarten programs.

Less clear are the effects of the preschool improvements on later school achievement. One would predict that children with near normal intelligence, average language ability, and good personal and social adjustment would be relatively successful in school. Yet only the second year EPS group was successful in meeting this expectation. An item analysis of the Binet gains made by the two EPS groups indicated that the second year group performed significantly better than the first year group on those subtests involving memory, motor coordination, and vocabulary. On the other hand, the first year experimental group was superior to the second year group on items involving concept formation and abstract reasoning. It is highly possible that the cognitive gains made by the second year group were more functional for successful school performance in a traditionally taught first or second grade.

Stearns, K. E. Experimental Group Language Development for Psychosocially Deprived Preschool Children. Unpublished doctoral dissertation, Indiana University, 1966.

Purpose: To develop and test a series of diagnostically oriented language lessons designed to remediate the psycholinguistic deficiencies of mentally retarded, psychosocially disadvantaged preschool children.

Subjects: Three groups of approximately 12 psychosocially deprived kindergarten aged EMR children from the first year of the Indiana Project (Hodges, McCandless, and Spicker, 1967), described above.

Procedure: The experimental group (EPS) received 67 diagnostically based language lessons developed by Stearns. These lessons were implemented by the classroom teacher during the second term of the year. Although no formal language lessons were used during the first term, the EPS teacher used numerous ancillary activities designed to develop language. A kindergarten contrast group (KC) received no direct language instruction other than that provided in traditional kindergarten programs (i.e., story telling and show and tell). An at home contrast group (AHC) received only the pre-midterm, and posttests consisting of the Illinois Test of Psycholinguistic Abilities (ITPA).

Results: During the diagnostic language treatment period (midterm to posttest) total language increases were made by all three groups. These increases were almost identical to the rate of gain made by the three groups during the first term. The language differences among groups were not significant. Over the entire school year—from pretest to posttest—the mean language gain of 19 months made by the experimental group was significantly greater than the gains of 12 and 7 months made by the KC and AHC groups, respectively.

Comment: The procedure used in this study permits the establishment of a base rate of language gain prior to treatment. One is thus able to assess the language improvements which were a function of the treatment, independent of other variables contributing to language development such as initial effects of school placement. In this particular study, it is evident that the structured language lessons did not accelerate the language gain rate established prior to treatment. The fact that the language gains of the EPS group from pre- to posttesting were significantly greater than those of the contrast groups seems to indicate that a total language development program throughout the school day is more essential than a short language development period each day.

Lillie, D. L. The Effects of Motor Development Lessons on the Motor Proficiency of Preschool Culturally Deprived Children. Unpublished doctoral dissertation, Indiana University, 1966.

Purpose: To develop and evaluate the effectiveness of a diagnostically based motor development program on the motor proficiency of mentally retarded, culturally deprived children of preschool age.

Subjects: Three groups of approximately 16 EMR psychosocially deprived kindergarten aged children from the second year of the Indiana Project (Hodges, McCandless, and Spicker, 1967), described previously.

Procedure: An experimental preschool group received a series of 65 diagnostically based motor lessons developed by Lillie. The kindergarten contrast group received a typical kindergarten curriculum, including socialization, communication skills, and school readiness activities. The home contrast group received only the pre- and post-testing consisting of the Lincoln-Oseretsky Motor Development Scale (L-O). Because the L-O yields only a total raw score, each item in the test was categorized as either gross or fine motor on the basis of previously conducted factor analytic studies of motor proficiency tasks.

Results: With pretest scores and CA as covariates on posttest L-O scores, the findings indicated that all groups had made significant increases in gross motor proficiency but that there were no significant differences in gross motor proficiency among the three groups. However, the fine motor proficiency of the experimental group was significantly superior to that of the kindergarten contrast group, which in turn was superior to that of the at home contrast group.

Comment: It is interesting to note that the gross motor gains made by the home contrast group were as great as those made by the two school groups which had been exposed to a daily half hour physical education period. On the other hand, the fine motor abilities of the home contrast group did not substantially increase over the year. Therefore, it appears that the opportunities provided in the home and neighborhood were adequate for enhancing gross motor proficiency but inadequate for enhancing fine motor proficiency. Since the motor lessons developed by Lillie stressed fine motor development, it is not surprising that his program affected fine rather than gross motor development.

CONCLUSIONS

Research on the effectiveness of preschool interventions has demonstrated that significant IQ changes can be made with intellectually subnormal, culturally disadvantaged children who have no organic brain impairments. Intervention programs designed to compensate for the specific deficits often associated with cultural deprivation appear to be necessary only for the so called hard core, psychosocially disadvantaged children; more traditional preschool programs appear to be as effective as special intervention programs with children from economically deprived middle class striving families.

A comparison of the Weikart project results with those of the Indiana Project indicates that a special curriculum intervention alone is as effective as a combined home and curriculum intervention program for producing preschool improvements; whether or not the home intervention enables the children to perform better in school remains to be demonstrated by further followup research.

Improvements in language and fine motor development seem to depend on direct intervention strategies rather than on incidental curriculum strategies.

The effects of preschool interventions on later school performance are rather discouraging. Although increases in the measured intelligence of the children have placed them within the normal range of intelligence, their school achievement continues to be below normal, and, for all intents and purposes, the children must be regarded as underachievers once they enter school. It is possible that too little attention has been directed toward increasing the achievement motivation of these children during the preschool intervention period; or, perhaps the traditional elementary school curriculum is not suitable for culturally disadvantaged children. It is, therefore, apparent that a major problem remaining to be investigated is the question of how to bring about achievement increments commensurate with IQ gains.

SCHOOL INTERVENTIONS

Administrative Arrangements

Efforts to accommodate retarded children in schools have by no means been limited to the preschool period. In fact, until recently, mildly retarded children were identified as such primarily as the result of referrals arising out of the children's inability to cope with conventional academic programs in the regular grades. The typical solution to the "problem" of retarded children in the public schools has been the creation of special classes in which it was assumed that the particular needs of such children could more adequately be met through the implementation of special curricula by specially trained teachers.

Comparisons of the achievement and behavior of retarded children in special classes with that of retarded children in regular classes have rather consistently shown that regular class children perform more adequately on standardized achievement tests, and special class children receive higher rankings by their teachers on social and emotional adjustment. Both of these findings may be criticized as being artifacts of the types of criterion measures used. It is not reasonable to expect special class children subjected to a "special" curriculum to perform as well on achievement tests that are designed to measure the content taught in the regular grades. Also, it is unlikely that a teacher who teaches only retarded children will use the same frame of reference as does a teacher of both retarded and normal children in the evaluation of a retarded pupil's social and emotional adjustment.

Previous efficacy studies have been subjected to the further criticism that poor achievers are placed in special classes while good achievers are allowed to remain in regular classes. Therefore, the groups are not comparable prior to treatment in the two settings. Other limitations attributed to previous efficacy studies are that (a) assignment to a special class is usually made only after a child has failed to achieve in the regular grades, (b) there has been inadequate control and description of kinds of teachers and curricula employed, and (c) most special classes constitute too heterogeneous a group to be efficiently handled by the teacher.

The following studies illustrate attempts which have been made in recent years to overcome some of the problems encountered in previous special class efficacy studies. These have included such factors as improvement in experimental design, development of more appropriate instruments, and control over the curriculum and teacher variables.

Goldstein, H., Moss, J. W., and Jordan, Laura J. The Efficacy of Special Class Training on the Development of Mentally Retarded Children. US Office of Education Cooperative Research Project No. 619. Urbana: University of Illinois, 1965.

Purpose: To determine whether school at age of 6 would accelerate the rate of mental development as it did at age 4½ (as in Kirk's 1958

Preschool Study), and to compare the rate of progress of mentally retarded children assigned to special classes and those remaining in the regular grades in intellectual gains, social adjustment, and academic achievement.

Subjects: All first grade children (1,938) in 20 school districts that did not have primary level special classes were administered the Primary Mental Abilities Test at the beginning of the school year. Children scoring at or below an IQ score of 85 were given the Stanford Binet. Those receiving IQ scores of 85 or below were randomly assigned to either newly created special classes or to continued placement in regular first grade. The 57 special class children had a mean IQ of 76.7 and mean CA of 77.3 months; the 69 regular class children had a mean IQ of 78.5 and a mean CA of 79.0 months. Three subjects moved before assignment. Subjects lost to the study through attrition (26.2 percent) were not significantly different from the original sample in terms of IQ.

Procedure: Procedures employed were specifically designed to avoid some of the shortcomings of previous efficacy studies. Thus, subjects were randomly assigned to special or regular classes before failure in the regular grades could occur. The curriculum guide for EMR classes in the state of Illinois was employed in the experimental classes. The teachers of experimental classes were closely supervised and attended conferences every six weeks; they also devoted four to eight weeks of the summer to preparation of materials and evaluation of the program.

All subjects in the sample were administered a large battery of psychological and achievement tests annually for four years. Interviews with the parents of the children were conducted during the first two years of the project.

Results: IQ's of both groups of children rose significantly during the first year of the study, then leveled off during the next three years. There were no significant differences between the groups. A *post hoc* analysis indicated that children having high terminal IQ's (above 80; mean IQ, 89) had had a mean initial IQ of about 77; children having low terminal IQ's (80 or below; mean IQ, 72) had had an initial mean IQ of about 72. Regardless of treatment, "low" IQ groups tended not to gain in IQ; "high" IQ groups tended to gain 12 to 13 points, thus declassifying themselves as "retarded." Children who increased more than 10 IQ points during the study were more often Caucasians, with mothers who had eight years or more of education and who interacted more with their neighbors; the high gainers also tended to have parents with a higher degree of marital integration than the parents of children who gained less than 10 IQ points or who lost IQ points.

There were in general no significant differences between experimental and control groups on academic achievement. However, a subanalysis indicated that the low IQ group in the special classes was superior to the low IQ group in the regular classes in arithmetic achievement, on the Test of Basic Information, and on four of ten language tests.

Mothers of experimental children rated their children as generally more able and adequate in school tasks than did mothers of control children.

Normal children in the neighborhood reported playing more often with regular class subjects than with experimental class subjects, although both groups were equally well known to the normal peers.

Control children were found to be more likely than experimental children to be studying from readers which were above their achievement level (and thus presumably experiencing more failure).

Special class subjects attempted to answer more difficult questions than regular class subjects (presumably being more willing to take risks).

No significant differences were found on anxiety measures taken during oral reading by the subjects.

Comment: This is the only efficacy study which has attempted to evaluate special classes under "ideal" conditions. The curriculum content was controlled, the teachers were highly trained and supervised, the children were selected prior to school failure, and the control subjects were randomly selected from the same population and, therefore, presumably had the same characteristics as the experimental children. In addition, evaluation instruments were specifically designed to measure the effects of the curriculum.

The fact that under these ideal conditions the experimental subjects performed no better than the control subjects indicates either that special classes are ineffective for the EMR, that the curriculum used was inadequate, and/or that first grade special class placement based only on intellectual subnormality (IQ of 85 or below) does not result in better school performance than does regular class placement. It appears from this and previous efficacy studies that special classes as presently constituted cannot be justified for the variety of EMR children that are now placed in such classes. It seems that future efficacy studies should concern themselves with determining which intellectually subnormal children cannot adequately benefit from regular class placement; then, experiments with a variety of administrative groupings, as well as with unique curriculum intervention strategies, should be conducted to determine how the school behavior of these children can be improved.

Cain, L. F., and Levine, S. Effects of Community and Institutional School Programs on Trainable Mentally Retarded Children. *CEC Research Monograph,* 1963, Series B, No. B-1.

Purpose: To assess the effects of special classes for trainable children in institutional and community settings on the development of social competency in such children.

Subjects: Four groups of trainable mentally retarded children meeting selection criteria for community school, institutional school, and institutional nonschool placement as specified by the California Administrative Code were constituted as follows:

1. Community Experimental Group—63 TMR's (mean CA 8-7; mean MA 3-7; mean IQ 41.9) attended one of 31 special public day classes and resided at home.
2. Community Control Group—46 TMR's (mean CA 8-4; mean MA 3-2; mean IQ 38.7) received no schooling but resided at home.
3. Institutional Experimental Group—40 TMR's (mean CA 10-4; mean MA 3-1; mean IQ 31.2) resided at the institution and attended one of four special classes therein.
4. Institutional Control—33 TMR's (mean CA 10-0; mean MA 3-0; mean IQ 29.9) resided at the institution but received no schooling.

Community groups did not differ significantly from each other on CA, MA, IQ, and initial social competency scores. The same was true for institutional groups. However, community groups differed from institutional groups with respect to these variables. None of the children had had prior school experiences.

Procedure: Measures were obtained on the subjects initially and after the two years of the study. To meet the need for a reliable instrument for assessing the development of TMR children, a special social competence scale was developed and standardized for use in the study. The scale consisted of 72 items divided into four subscales: Self Help, Initiative-Responsibility, Social Skills, and Communication. No special curriculum or teaching strategies were implemented in the study, but ongoing practices in the community and institutional classes were observed and evaluated.

Results:

1. Both school and nonschool at home groups made significant improvement in social competency during the two years. Differences between the two groups were not significant.
2. Both school and nonschool institutional groups significantly decreased in social competency, with no significant differences between groups.
3. Both school and nonschool community groups made significantly greater social competency gains than either the school or nonschool institutional groups.
4. In the community schools, approximately 44 percent of classroom time was categorized as instructional in nature, with about half of this time classified as "low adequacy."
5. In the institutions, 35 percent of classroom time was categorized as instructional, of which less than 2 percent was categorized as "high adequacy."

Comment: The major implication of the findings of this study is the need for improved teaching practices in classes for TMR children. Despite the fact that the school children showed no greater gains than the nonschool children, it cannot be said that classes for TMR children are not potentially useful. Perhaps TMR school children would show greater improvement in social competency if these skills were in fact systematically and efficiently taught in the special classes. The need for improved instruction appears to be even greater in institutions than in community schools. The effect of institutional arrangements seems to have a debilitating effect on the social development of TMR children; it remains to be seen whether this effect can be ameliorated through a sound educational program.

In attempts to improve the effectiveness of special classes for the EMR, certain administrative modifications have been made. Evaluations of two such programs are reported below.

Wrightstone, J. W., Forlano, G., Lepkowski, J. R., Sontag, M., and Edelstein, J. D. A Comparison of Educational Outcomes under Single-Track and Two-Track Plans for Educable Mentally Retarded Children. US Office of Education Cooperative Research Project Report No. 144. New York: New York Board of Education, 1959.

Purpose: To compare changes in academic achievement, motor coordination, speech, personal and social adjustment, attitudes and interests, and peer acceptance of educable mentally retarded children enrolled in an experimental two track program with changes of matched mentally retarded pupils enrolled in a one track program; to assess the reactions of parents and educators to the two programs; and to develop tests and measures required for these assessments.

Subjects: One hundred sixty-two experimental, two track classes (Educable I—IQ's 60 to 75, stable social and emotional adjustment; Educable II—IQ's 50 to 59, more physical defects, poorer social and emotional adjustment, less favorable expectation of employability); and 139 control one track classes (heterogeneous groups of children with IQ's of 50 to 75, all levels of adjustment) were available as subject pools. These 201 special classes constituted about one-third of New York City's school age EMR population and represented a cross section of socioeconomic levels. All pupils participated in a mass testing program, the results of which were used in some of the analyses; for most of the many substudies of the study, certain random and matched samples were selected. There were approximately twice as many high educable (Educable I) as low educable (Educable II) classes. The total number of subjects was 3,627. CA range extended from approximately 8.5 to 17.0 years. Over half of the subjects had been placed in special classes at CA 10 or older. Almost two-thirds of the subjects were lost to the study during the first year, due to classes not meeting criteria for heterogeneity or homogeneity of IQ levels of pupils, pupil turnover, and incomplete data.

Procedure: An extensive battery of standardized and project developed tests were administered to the subjects. Other data were collected by check lists and ratings by teachers, supervisors and principals, questionnaires mailed to former pupils, parents and employers, and direct interviews. Data were collected over a period of two years, with most of the study-designed instruments being used only in the second year of the study.

Subjects in the high educable and control groups received the "core" curriculum related to the home, school, and community. The older children received training in citizenship and vocations as well. The curriculum for low educable two track children was designed to meet the physical, social, emotional, and academic needs of the children.

Results:

1. Of 40 separate comparisons between achievement of matched pairs of the one track and two track groups, six were statistically in favor of the one track and one was in favor of the two track plan.

2. No significant differences were found on tests of motor coordination.
3. Teacher ratings of pupil growth in oral communication yielded significant differences in favor of the low educable two track subjects when compared with their counterparts in the one track plan. Differences between high educable subjects were insignificant, as were comparisons of oral communication in experimental and control groups when the ratings were made by psychologists rather than teachers.
4. Peer acceptance ratings obtained from a sociometric measure during the first year of the study showed the experimental low educable subjects to be significantly more accepted than their control counterparts. However, these differences were not obtained during the second year of the study when peer acceptance measures were derived directly from pupils as reported to psychologists. No differences were found on comparisons between high educable subjects.
5. Teacher ratings of emotional and social maturity of pupils showed no clearcut differences between the groups.
6. Teacher ratings of such factors as pupils' work habits, willingness to learn, and punctuality showed the experimental subjects to be significantly superior on several comparisons. No differences were found on data obtained from scores on the Pupil Behavior Checklist.
7. Questionnaire response by teachers and supervisors indicated a preference for the two track program, although there was some dissatisfaction with the concentration of emotionally disturbed children in the low educable classes and with low morale of teachers in the low educable groups.
8. Parents responded favorably to both programs with no differences favoring one above the other.
9. No significant differences in pupils were found in comparisons of vocational choice and knowledge of the requirements for chosen vocations.

Comment: This study provides no conclusive evidence either for or against a two track plan for EMR's. The lack of significant differences found in most of the comparisons may have been due to the fact that the children were studied for only two years. However, a more plausible interpretation presents itself when the actual composition of the high educable and low educable groups is examined. Children had been designated as high educable or low educable by teachers on the basis of IQ, motor development, physical health, prognosis for educational achievement and occupational success, social and emotional adjustment, and other factors. The mean IQ for all experimental Educable I boys in the study was 68.62, for experimental Educable II boys the mean IQ was 60.74, for control Educable I boys 67.89, for control Educable II boys 63.04. The corresponding mean IQ's for girls were 67.04, 56.80, 66.84, and 60.44. It is apparent that there is a great deal of overlap in IQ between the high educable and low educable groups, especially when it is noted that the IQ ranges in both groups were from 50 to 75. With identical IQ ranges, and only small differences in IQ means, it becomes questionable whether it is meaningful to designate one group as homogeneous and the other as heterogeneous with respect to IQ. Perhaps the reason that so few significant differences were obtained may be the fact that the groups were not substantially different from each other in intelligence. (No statistical tests of differences in IQ between groups are reported.)

It is interesting to note that most of the obtained differences resulted from comparisons made from teacher ratings. It is not surprising that such differences would be in favor of the experimental two track plan when it is noted that most of the teachers expressed favorable evaluations of the two track plan. It seems reasonable that these findings are related to the fact that the original designation of the pupils as high educable or low educable was made by the teachers although the nature of this relationship cannot be determined from the findings. An interesting subanalysis of the data would have been to compare achievement and adjustment ratings from teachers who had favorable attitudes toward the two track plan with those ratings from teachers who had expressed reservations about the experimental grouping.

Welch, Elizabeth A. The Effects of Segregated and Partially Integrated School Programs on Self Concept and Academic Achievement of Educable Mental Retardates. Unpublished doctoral dissertation, University of Denver, 1965.

Purpose: To study the effects of segregated and partially integrated school placement on the self concept and academic achievement of educable mentally retarded children.

Subjects: Two groups of EMR children with Binet IQ's of 60 to 80; one group assigned to a segregated (special class) condition, the other group assigned to a partially integrated condition (one half of the school day with other retarded children, the other half of the day in a regular classroom). None of the retarded subjects had had previous experience with any form of special education. Also included in the analysis was a random sample of children with normal intelligence attending the same classes as the partially integrated retardates and a sample of children with normal intelligence having no school contact with retardates. A summary of sample characteristics is presented in Table 1.

TABLE 1. *Characteristics of Groups*

Groups	*Mean CA*	*Mean IQ*	*N*
Normal Integrated	8.17	110.52	26
Normal Segregated	7.97	106.00	27
Retarded Integrated	8.16	73.91	23
Retarded Segregated	8.77	70.77	25

Procedure: The Illinois Index of Self Derogation (IISD) and the Wide Range Achievement Test (WRAT) were administered to all subjects after one month of school and again after an additional eight months. Difference scores were used to measure the impacts of the particular educational treatment on the subjects. (For a description of the IISD, see Meyerowitz, 1962, which is in the following section.)

Results: Retarded integrated subjects showed a significant decrease in the number of derogatory statements they attributed to themselves; the reverse was true for the retarded segregated subjects. No significant changes occurred in either of the normal groups on responses to the IISD. All groups made significant gains in reading, spelling, and arithmetic, with the retarded integrated group making significantly greater gains in reading than the retarded segregated group.

Comment: Previous efficacy studies have generally compared EMR special class children with EMR regular class children. Since this study contained no comparisons with retarded children in the regular grades, it is not directly comparable with previous efficacy studies. It does, however, confirm previous findings that retarded children in special classes make relatively small academic gains when compared with retarded children who are in settings in which they must compete with normal children.

In the past, special classes have frequently been justified as being in the best interests of retarded children even when no academic advantages were evident, based on the assumption that retardates in the special class setting, freed from academic competition with brighter peers, might begin to see themselves as more competent and worthy. The results of this study, as well as those of Meyerowitz (1962), suggest that exactly the opposite may be taking place. Children segregated on the basis of intellectual inferiority not only perform less adequately but more often see themselves as being inadequate and rejected. If this finding is substantiated by future research, it must be considered one of the most damaging indictments against special classes for the retarded. It appears that the stereotype of the special class in which the pupils are happy and satisfied because of minimal academic pressures has no actual basis in fact when objectives measures are employed. A limitation of this study is the small number of participating experimental classes.

Personal and Social Adjustment. Of continuing interest to researchers is the personal and social adjustment of retarded children and the question of whether such adjustment is facilitated or attenuated by special administrative arrangements. In addition to presenting various studies which deal with these questions, the following section will also consider one study that is concerned with discovering how poorly adjusted retarded children can be helped to make a more satisfactory adjustment.

Jordan, June B. Intelligence as a Factor in Social Position—A Sociometric Study in Special Classes for the Mentally Handicapped. Unpublished doctoral dissertation, University of Illinois, 1960.

Purpose: To determine if intelligence is a prime factor in the social status and perceived social status patterns that exist within special education class groups.

Subjects: Three hundred forty-nine special class children of junior and senior high age, 224 boys and 125 girls in 22 classes. CA range was from 11 to 19 years. Binet IQ's ranged from 42 to 89 with a mean of 68.69. One hundred sixty-six subjects had IQ's of 69 or less; 183 had IQ's of 70 or above.

Procedure: Each class teacher individually and privately asked each pupil to name the children in his class he would like and not like to sit near him, and to name the children he thought would pick him to sit or not to sit near him.

Results: No overall differences in acceptance, rejection, and total status scores were found between children of IQ scores of 69 and below as compared with children of IQ's above 69 when each class was considered as an individual unit. However, when sociometric scores of all children with IQ's of 69 and below were compared with all children with IQ's of above 69, significant differences were found on total social status scores but not on acceptance and rejection scores.

When children in the lowest IQ quarter of each special class were compared to their classmates, it was found that these low IQ children were significantly more rejected than their classmates and that they obtained significantly lower total social status scores than the higher IQ children. No differences were found in the perception of their sociometric positions by children with IQ's of 69 and below as compared with children with IQ's of 70 and above.

Comment: The findings of this study indicate that lower IQ children are more rejected and lower in social status than their brighter peers in the special class; this is the same pattern that exists in the regular class. It is not known whether this is due to a misplaced emphasis on academic achievement on the part of special class teachers or to actual behavioral differences in the socialization patterns of lower IQ children. In any case, placement in a special class does not ensure peer acceptance for low IQ children.

Johnson, G. O. A Comparative Study of the Personal and Social Adjustment of Mentally Handicapped Children Placed in Special Classes with Mentally Handicapped Children Who Remain in Regular Classes. Syracuse: Syracuse University Research Institute, 1961.

Purpose: To compare the personal and social adjustment and peer acceptance of mentally handicapped children in special classes with similar children remaining in the regular grades.

Subjects: Sixteen pairs of children, Binet IQ's of 50 to 75, CA's of 10-0 to 15-0 years, matched on sex, CA, MA, and IQ. Schools from which the subjects were drawn had been subjectively equated on socioeconomic status, school facilities, and general instructional procedures used. One child in each pair was in a special class for the retarded; the other child in the pair was drawn from the regular grades in communities that provided no special classes for the retarded.

Procedure: The Syracuse Scales of Social Relations (a modified sociometric device), the California Test of Personality, and the California Achievement Test were administered to each subject.

Results: Comparisons of personal and social adjustment as measured by the California Test of Personality (CTP) showed no significant differences between special class retarded and regular class retarded children. Regular class retardates achieved statistically lower scores on personal and social adjustment than did children of normal intelligence in the same classrooms. Comparisons between special class children and normal children on the CTP are not reported.

As measured by the Syracuse Scales of Social Relations, special class children were found to be much like the normal children in peer acceptance, but special class children were significantly more accepted by their peers than were retarded children in the regular grades.

Comment: Johnson defends the use of the Syracuse Scales of Social Relations (SSSR) because "it is theoretically possible for each and every person within the group to be highly accepted or highly rejected." However, it is highly unlikely that any subject would rank all his classmates as equally liked or disliked. An examination of the obtained means and *SD*'s indicates that this event did not occur. Thus, although the SSSR purports to provide for the establishment of an independent frame of reference, in effect each child was still required to rank his classmates as to degree of like or dislike, etc. It should also be noted that the mean acceptance scores of the retardates in special classes were not significantly different from the mean acceptance scores of normal children in the regular grades, and that both means were not significantly different from means obtainable by chance alone. Only the scores of the retardates in the regular grades were significantly different from what one might obtain by chance. One interpretation of these findings is that this study shows nothing more about peer acceptance than that retardates in the regular grades are rejected by their peers; all other scores can be attributed to chance factors.

Meyerowitz, J. H. Self-derogations in Young Retardates and Special Class Placement. *Child Development*, 1962, *33*, 443-451.

Purpose: To compare the self concept of young retarded children in special classes with that of retarded and normal children in regular grades.

Subjects: One hundred twenty children with Binet IQ's of 60 to 85 randomly assigned to special classes (EMH experimental) or regular grades (EMH control) at the beginning of first grade; 60 children of normal intelligence matched to the retarded group on the basis of residence in the same community by father's occupation and family income. (For further description of subjects, see Goldstein, Moss, and Jordan, 1965.)

Procedure: The Illinois Index of Self-Derogation (IISD) was administered to all subjects at the end of first grade. The IISD had been previously tested with various samples of preschool children to establish reliability and validity, which were found to be satisfactory. Factor analysis of the instrument yielded one principal factor—degree of self derogation. The instrument consists of 22 scorable items, each of which describes a child with a socially desirable or socially undesirable description. The subject indicates which child is most like himself.

Results: EMH children were found to be signficantly more derogatory of themselves than the criterion children of normal intelligence. EMH children in special classes were found to be significantly more derogatory of themselves than EMH children in the regular grades.

Comment: These results provide evidence that even first grade children are sensitive to their own ability to meet the intellectual demands of the schools. The finding that retarded children in general are more derogatory of themselves than are children of normal intelligence is of particular significance, since the two groups were equated on social class. Unfortunately, no pretest data are available to establish whether lower class retarded children (EMH groups) are different from lower class children of normal intelligence (criterion group) in patterns of self derogation before school entrance. It is, thus, not possible to confidently ascribe the differences obtained at the end of first grade to either home or school factors. However, the finding that EMH experimental children were significantly more derogatory of themselves than EMH control children can be attributed to the special treatment and segregation accorded the experimental children, since these two groups were randomly assigned. Contrary to the findings and interpretations of previous studies, these results show special class placement for mildly retarded children leading to a significantly poorer self concept in the children. Since the measure of self concept used in this study had been specifically designed for and validated with children of MA's similar to those used in the study, and since the special and regular class children had been randomly assigned to their respective groups (thus precluding the operation of a selection factor), it appears that our best evidence to date is that special class placement of young children attenuates the development of a favorable self concept.

Kern, W. H., and Pfaeffle, H. A Comparison of Social Adjustment of Mentally Retarded Children in Various Educational Settings. *American Journal of Mental Deficiency,* 1962, *67,* 407-413.

Purpose: To compare the social adjustment of mentally retarded children in three educational settings—special classes, special schools, and regular classes.

Subjects: Ninety-three educable retarded children, 31 attending special classes within regular schools (mean CA 11-2; mean MA 8-3;

mean IQ 74.29); 31 children attending a special school for the retarded (mean CA 13-8; mean MA 9-2; mean IQ 67.25); and 31 children on waiting lists for special class placement but still in regular grades at the time of the study (mean CA 13-1; mean MA 8-7; mean IQ 65.75).

Procedure: The Social Adjustment section of the Elementary Form of the California Test of Personality was individually administered to all subjects. The subtests of this section are (a) social standards, (b) social skills, (c) antisocial tendencies, (d) family relations, (e) school relations, and (f) community relations. The test was modified by having the experimenter read and record all responses for the subjects. Raw scores were used in the analysis of the data since standardization norms were felt to be inappropriate for this retarded population.

Results: Although the groups responded differently on the test as a whole, an analysis by subtests indicated significant differences between waiting list children and special school children only on the family relations subtest and between waiting list children and both special school and special class children on the school relations subtest. The differences indicated less satisfactory adjustment on the part of the regular class children on these two subtests. All other differences were not significant.

Comment: This study offers some limited evidence that educable retardates in special classes or special schools show more satisfactory social adjustment than similar children in the regular grades. This finding is not altogether surprising when it is noted that the relatively more favorable adjustment of special class retardates was found on test items requiring the subject to rate his ability on school tasks (e.g., "Is schoolwork so hard that you are afraid you will fail?") but not on more general test items (e.g., "Should children be nice to people they don't like?"). If the academic requirements in special classes and in special schools are more relaxed than those in regular grades, these responses indicate that retarded children are able to perceive and judge with accuracy their relative competence in the various settings.

Towne, R. C., Joiner, L. M., and Schurr, T. The Effects of Special Classes on the Self-concepts of Academic Ability of the Educable Mentally Retarded: A Time Series Experiment. Paper read at The Council for Exceptional Children, St. Louis, Missouri, 1967.

Purpose: To study the effects of special class placement on self concept of ability.

Subjects: Sixty-two educable mentally retarded pupils, ages 6 to 15, who were on waiting lists for special class placement.

Procedure: A "self concept of academic ability" measure was administered to all the subjects before they were told of their impending placement in special classes. This measure was readministered the following school year (after special class placement) in September, December, March, and June. The test consisted of eight items which asked the subjects about how well they thought they were doing in school (e.g., "How do you rate yourself in school ability compared with your close friends?").

Results: Responses of the subjects showed significant improvement in self concept of ability after special class placement. Scores continued to improve until the end of the first year in the special class when a decrease in scores occurred.

Comment: This longitudinal study represents a desirable design for research investigating changes in self concept. However, the fact that no control group was used makes it impossible to tell whether the changes in self concept were actually a function of special class placement, or whether self concept as measured here is related to the school year itself. For example, the children's self concept improved as they made new friends or became acquainted with a new teacher. An appropriate control would have been a group of retarded children who experienced a change in placement from one regular class to another.

An analysis of the data by age groups might have yielded some interesting findings. It is quite possible that younger children's initial reactions to special class placement are quite different from the reactions of older children, who are more likely to understand the nature of the special class and to perceive the kind of judgment about themselves that special class placement implies. The use of a single instrument with children ranging in age from 6 to 15 leads one to wonder whether the same kinds of concepts were being measured at all ages. It is possible that test items that are simple enough for a 6 year old to understand are simple enough for a 15 year old to fake.

Snyder, R. T. Personality Adjustment, Self Attitudes and Anxiety Differences in Retarded Adolescents. *American Journal of Mental Deficiency,* 1966, *71,* 33-41.

Purpose: To investigate the extent to which personality factors are related to academic achievement, generally, in a sample of retardates obtained from various settings.

Subjects: One hundred seventy junior high age educable retardates, Negro and Caucasian, male and female, institutionalized and noninstitutionalized, from public and parochial schools, and from urban and rural areas, were grouped as high or low academic achievers. Mean IQ of high achievers was 70.53, range 51 to 79; mean IQ of low achievers was 66.87, range 50 to 79. An attempt was made to equate high and low achieving groups on sex, intelligence, and socioeconomic status. CA range of the sample was from 14-11 to 18-11.

Procedure: The California Test of Personality (CTP) and an abbreviated form of the Laurelton Self Attitudes Scale were administered to all subjects, and human figure drawings by the subjects were scored for anxiety signs. Questions on the two tests were read by the experimenter in order to provide a control for reading differences. Standardized achievement test scores on arithmetic and reading were averaged to obtain an academic attainment score.

Results: High achievers scored significantly higher on the California Test of Personality and the self attitude scale and significantly lower on the clinical test of anxiety. As a group, the retardates performed at a significantly lower level on the personality test than did the normative group. This finding held even when the institutionalized subjects were eliminated from the analysis. Female retardates showed significantly less anxiety than males.

Comment: While the finding—that a general sample of retarded adolescents scores below the norms of the CTP—is of interest, it should be noted that this instrument is of questionable validity with a retarded population. Hence comparisons with norms obtained from normal subjects may be misleading. Perhaps of greater importance are the obtained differences between high and low achieving retardates, which indicate that low achievement is significantly correlated with lower personal and social adjustment, poorer self attitudes, and greater anxiety.

Chaires, Madelyn C. Improving the Social Acceptance of Unpopular Educable Mentally Retarded Pupils in Special Classes. *American Journal of Mental Deficiency*, 1967, 72, 455-458.

Purpose: To study a technique for improving the social status of poorly accepted retarded children in special classes.

Subjects: Sixty-four children, the four least accepted children in each of eight intermediate and eight junior high school classes for EMR's. Social status was determined by a sociometric measure. Half the classes were assigned to an experimental treatment and half the classes were assigned to a control condition.

Procedure: Two of the low status children in each of the experimental classes were paired with two high status children in the same class. These groups worked with the experimenter outside the classroom for two 15 minute periods weekly for five weeks in the preparation of a play which was presented to the class at the end of the experimental period. Sociometric tests were used to establish pre- and postexperimental status levels.

Results: Experimental children improved significantly in actual peer acceptance and in perceived peer acceptance. Improvements in the status of subjects participating in the treatment were significantly greater than changes in status of control subjects.

Comment: This study demonstrates a simple but effective technique for improving the social status of retarded children who are poorly accepted by their classmates. However, the design of the study makes it impossible to determine precisely which factor in the treatment brought about the changes—the pairing with high status children, the interaction with the experimenter in a "special" activity, or the presentation of the play to the class. It is not known whether the improvement in social status is temporary (post measures were administered immediately after the last treatment session) or whether lasting changes in social status were accrued. It would be of interest to know whether the obtained improvements were exhibited only in the classroom, or whether the subjects had actually improved in social skills as a result of the group work and hence were better able to relate to their peers in other contexts, such as on the playground. It should also be noted that the experimental children were involved in treatment sessions for a total of only two and one-half hours each. If reliable improvements in social status can be gained in such a short period of time, it should be possible for a classroom teacher who has at her disposal many more hours of potential group work for her pupils to bring about consistent improvements in the peer acceptance of low status pupils.

In Review

The discrepant findings of the studies reviewed in this section appear to be a function of the nature of the particular test or measure being employed. When the test items imply that the subject is to compare himself with his classmates, the special class child emerges as better "adjusted" than the regular class child. When the test items imply a more general frame of reference, the segregated retarded child in a special class is more likely to be chosen by his classmates as "best liked" on sociometric measures because he does not have to compete with normal children for the "best liked" positions as does the retarded child in the regular grades.

School Performance and Curriculum Modifications

When comparing retarded children in special classes with those in regular classes it is difficult, if not impossible, to separate the effects of the administrative arrangement from the curriculum modification employed. To control for the effects of administrative arrangements, the majority of studies included in this section were selected from those in which school performance or curriculum comparisons were made between children in comparable administrative settings.

Reading. The reading performance of retarded children continues to interest many researchers. It appears that the research trend in reading has shifted away from comparative studies between cultural familial and brain injured EMR children or between EMR and normal children of the same MA. Instead, researchers are attempting to determine why EMR children are poor readers and to discover procedures which will improve the reading performance of retarded children. The studies which follow illustrate some of these research approaches.

Sheperd, G. Selected Factors in the Reading Ability of Educable Mentally Retarded Boys. *American Journal of Mental Deficiency*, 1967, *71*, 563-570.

Purpose: To compare the reading performance of retardates who are adequate readers with the reading performance of retardates who are inadequate readers.

Subjects: Twenty educable mentally retarded "adequate" readers (Gates reading age at or greater than MA expectancy; mean CA, 11-10; mean MA, 8.5; mean IQ, 72.05) matched by MA to 20 "inadequate" readers (Gates reading age below MA expectancy; CA, 12-2; mean MA, 8.5; mean IQ, 69.65). All subjects were male Caucasians, and had spent one or more years in special classes for the educable mentally retarded.

Procedure: An extensive battery of tests designed to measure the following factors was administered to each subject. It included: (a) silent reading and oral reading; (b) pattern of reading errors; (c) fund of basic information; (d) ability to use context clues; (e) memory for designs; (f) visual closure; (g) ability in psycholinguistic functions; (h) handedness, eyedness, and lateral dominance; (i) personal adjustment; and (j) home conditions.

Results: Inadequate readers were significantly poorer on sound blending; made more errors of faulty vowels, faulty consonants, reversals, omissions of sounds, substitution of words, words aided or refused; and made significantly fewer repetitions than adequate readers. Inadequate readers were less able to use context clues. Adequate readers performed better on the section of a test of general knowledge in which reading was required but not better on the section in which reading was not required. There were no differences between groups on auditory discrimination, memory for designs, visual closure, handedness, eyedness, or lateral dominance. On the Illinois Test of Psycholinguistic Abilities, the adequate group was significantly superior on the Auditory Vocal Sequential subtest. Both groups performed below MA level on the ITPA subtests. On one of the teacher ratings employed, the adequate group was found to be more socially and emotionally adjusted; on the other teacher rating measure, no significant differences were found. No significant differences were found in home conditions (such as economic status, parent employment, parent-child relationships).

Comment: The lack of significant differences between the many factors (such as lateral dominance or visual closure) investigated in this study suggests that, contrary to several theories, no one variable is able to account for more than a fraction of the cases of reading disability among the educable retarded. Ability to read appears to be a highly individual variable, and factors that accompany reading disability in one case accompany reading ability in another. The finding that the inadequate readers exhibited their greatest disability in phonetic word attack skills points out the possibility that a phonetic approach to reading such as the initial teaching alphabet may be of benefit to a number of the poor readers.

Frey, R. M. Reading Behavior of Public School Brain Injured Children of Average and Retarded Mental Development. Unpublished doctoral dissertation, University of Illinois, 1961.

Purpose: To compare the reading behavior of a group of brain injured children of average and retarded mental development with that of a matched group of non brain injured children.

Subjects: Twenty brain injured children (BI) were matched with 20 non brain injured children (NBI) on the basis of mean IQ (79), MA (8-2), and CA (10-4). Determination of brain injury was made on the basis of perceptual problems exhibited on psychological tests, with confirmation of organicity by a neurological examination. The brain injured group had been taught by the Strauss-Lehtinen method for an average of two and one-half years, while the non brain injured group had been taught by traditional methods in regular or special classes.

Procedure: An extensive battery of diagnostic reading tests was administered to all subjects for comparative purposes.

Results: The BI group was superior to the NBI group on both measures of silent reading. The differences on the Gates test were significant at the .05 level, but differences were not significant on the Monroe Word Discrimination Test.

On oral reading, on both the Gray and the Iota tests, the BI group scored significantly higher than did the NBI group.

No significant differences were found between the groups on the following types of errors: reversals, addition of sounds, repetitions, additions of words, omissions of words, and words aided or refused. The NBI group made a significantly greater number of the following error types: faulty vowels, faulty consonants, omissions of sounds, and substitution of words.

The BI group performed significantly better in ability to blend sounds as measured by the Monroe Sound Blending Test.

No significant differences in reversals were found.

No significant differences in visual memory were found.

Comment: This is one of the few research investigations on the efficacy of the Strauss-Lehtinen curriculum with children selected on the basis of the behavioral symptom of perceptual disturbance described by Strauss. Although the experimental children instructed according to the Strauss-Lehtinen curriculum made significantly better reading improvement than the group not brain injured, it is not possible to determine from this study whether this particular curriculum is necessary for all perceptually disturbed BI children. The study could have answered this question had the control group been comparable in behavior to the experimental group, especially in the area of perceptual disturbance. It may be recalled that Cruickshank, Bentzen, Ratzeburg, and Tannhauser (1961) found no advantage for the Strauss-Lehtinen curriculum over traditional approaches when experimental and control groups had been matched on the basis of hyperactivity, learning disorders, and/or organicity. However, if the Frey results are substantiated by further research, the need for behavioral rather than medical diagnoses for determining an educational treatment for brain injured children will be apparent.

Jordan, Laura J. Verbal Readiness Training for Slow-Learning Children. *Mental Retardation*, 1965, *3*, 19-22.

Purpose: To study the effects of prolonged prereading verbal activities on subsequent reading achievement of educable retarded children.

Subjects: Eighty-three EMR public school children, Binet IQ range of 60 to 85, who had been randomly assigned to experimental (special class) condition or control (regular class) condition at the beginning of first grade. No first grade repeaters were used as subjects (see review of study by Goldstein, Moss, and Jordan, 1965).

Procedure: For the first year, children in the experimental classes were given extensive verbal readiness training with emphasis on auditory and visual skills, concept development, verbal reasoning, vocabulary, comprehension, and sequence, along with practice in following verbal instructions. Extensive use was made of experience charts. A modified basal reader approach was used in grades two through four. No special modifications were made in the curriculum of control children in the regular grades. Progress in reading was measured in both groups by reading tests administered at the end of first, second, third, and fourth grades with third grade data omitted from the analysis because of the presence of a marked floor effect in the subjects' scores. Difference scores (discrepancy between tested grade placement and expected achievement) were used in the comparisons.

Results: At the end of the first year, control subjects performed significantly better than experimental subjects on all reading tests (Lee-Clark Reading Test and subtests of the Harrison Stroud Reading Readiness Profiles). At the end of the second year, the control subjects had significantly lower discrepancy scores on the word discrimination and reading subtests of the Metropolitan Achievement Test, indicating continued superiority over experimental subjects. However, at the end of the fourth year, discrepancy scores were lower (but not significantly so) for the experimental children, indicating that the early superiority of the control children had been erased.

Comment: This study offers evidence that time purposefully spent on prereading activities may be well spent with educable retardates and may lead to superior achievement in the long run (assuming that the indicated rates of learning continue). It should be noted that both groups were performing at well below their expected achievement level.

Woodcock, R. W., and Dunn, L. M. Efficacy of Several Approaches for Teaching Reading to the Educable Mentally Retarded. US Office of Education, Project No. 5-0392. Nashville: George Peabody College for Teachers, 1967.

Purpose: To compare six different approaches for teaching reading to educable mentally retarded children.

Subjects: A sample of approximately 360 children enrolled in 85 primary EMR special classes located in Chicago and Detroit who had not yet learned to read or who were in the very earliest stages of beginning reading. The mean IQ of the sample was 66, the mean MA was 5-6, and the mean CA was 8-8. The six groups constituted for the study did not differ significantly in IQ, MA, or CA.

Procedure: The special class teachers who volunteered to participate in the project were randomly assigned to one of six reading approaches; however, teachers voicing strong objections to a particular approach were randomly assigned to one of the remaining five approaches. The experimental approaches were as follows:

1. A language experience approach using traditional orthography.
2. A basal reader approach using traditional orthography.
3. A programed text approach using traditional orthography.
4. A language experience approach using the Initial Teaching Alphabet.
5. A basal reader approach using the Initial Teaching Alphabet.
6. A basal reader approach using rebus symbols.

Common to all approaches was the availability of an extensive program of supplementary reading and the use of the Peabody Language Development Kit by each experimental teacher to provide a greater degree of standardization among all teachers with respect to the total language arts program. The instructional program lasted for two years.

Results: At the end of the two year treatment period, there were no significant differences among the groups receiving the six different reading approaches on seven measures of reading ability. These included the Word Knowledge, Word Discrimination, and Reading subtests of the Metropolitan Reading Test, and the Letter Recognition, Word Reading, Sentence Reading, and Reading Comprehension subtests of the Beginning Reading Test developed by Woodcock and Pfost. The latter test had been developed to discriminate among children reading at first grade levels and was individually administered to the subjects. The overall mean reading achievement at the end of two years was five and one-half months.

Comment: This study illustrates that subject selection criteria can have a profound influence on the outcome of a study. The use of subjects who had not yet learned to read as opposed to those who had not yet been exposed to reading instruction provided the investigators with a group of older children with lower IQ's, who had already experienced extensive reading failure prior to the experimental reading treatment. The study clearly indicates that none of the approaches used was effective in providing the remedial reading instruction needed by the majority of the children.

The fact that there was a great amount of reading achievement variance among the children in different classes in which the same approach was used indicates that teacher effectiveness in implementing a reading method may be of greater importance than the particular method used. It may also indicate that a particular reading approach is effective for some children and not effective for others.

In Review

Several conclusions emerge from studies of the reading performance of EMR children. Most important is the finding that there appears to be no one characteristic of EMR children that can account for all reading difficulties. Hence it is not possible to prescribe a reading method that will be effective with all, or even most, of the children. This fact is demonstrated most dramatically in the Woodcock and Dunn (1967) study, in which no one method of reading produced results that were better than those obtained with any other method. Of the studies reviewed here, only the Frey (1961) study, which employed teaching strategies that were particularly adapted to the presumed characteristics of the subjects, produced results that were significantly in favor of the experimental group. Although studies such as that by Sheperd (1967) clearly indicate the need for a reading program that is designed for the particular abilities and disabilities of a given child, a well designed diagnostic individualized reading study with EMR children has yet to appear in the literature.

Arithmetic. Hardly any research on teaching arithmetic to retarded children has been reported in the literature. The need for innovative approaches for teaching functional arithmetic to the retarded is demonstrated by the following study.

Finley, Carmen J. Arithmetic Achievement in Mentally Retarded Children: The Effects of Presenting the Problem in Different Contexts. *American Journal of Mental Deficiency,* 1962, *67,* 281-286.

Purpose: To study the effects of varying the presentation of arithmetic problems in normal and retarded children.

Subjects: Fifty-four mentally retarded children in special classes, IQ's of 50 to 75, mean CA of 13-7; 54 normal subjects in regular classes, IQ's of 90 to 110, mean CA of 8-9. Groups were equated for MA (8-0), for boy:girl ratio and for approximate socioeconomic status.

Procedure: Three 20 item tests were prepared and administered in weekly intervals in the following sequence: concrete, pictorial, symbolic. The concrete test was an individually administered instrument in which money and objects fastened to a board were used to illustrate the problems. The pictorial test items were illustrated through drawings of money and objects while the symbolic test employed symbols only. These latter two tests were group administered. The concrete and pictorial tests were read to the children to control for differences in reading ability. The same computational combinations were used in the three tests, and these combinations were equally divided among addition, subtraction, multiplication, and division.

Results: The normal subjects performed significantly better on the pictorial test than on the other two; the retarded subjects tended to do least well on the concrete test. The retarded subjects performed significantly better than normals on the symbolic test but not on the other two forms.

Comment: This study suggests that retardates may be most deficient in the very arithmetic abilities they will be most likely to need in actual life situations—in functional problem solving involving the use of real money and objects. It also suggests that classroom teachers may be emphasizing the manipulation of arithmetic symbols to the neglect of arithmetical understanding. The finding that retarded subjects performed more adequately than normal subjects on the symbolic test may be attributed to the fact that the retarded subjects were older and had been exposed to multiplication and division processes, whereas the younger normal subjects had not yet studied these.

Language. Increased awareness of the poor language functioning abilities of most retarded and/or culturally disadvantaged children has produced a number of studies designed to improve the language abilities of these children.

Smith, J. O. Effects of a Group Language Development Program upon the Psycholinguistic Abilities of Educable Mental Retardates. *Peabody College Special Education Monograph Series,* 1962, No. 1.

Purpose: To study the effects of a group language development program upon the psycholinguistic abilities of educable mentally retarded children.

Subjects: Sixteen pairs of educable mentally retarded children enrolled in public school special classes (IQ's between 50 and 89) matched on the basis of pretest ITPA language age scores (mean 5-0) and CA (mean 8-11). Children with significant visual, hearing, or physical impairments were excluded from the study.

Procedure: The experimental subjects were taken from their special classes, in groups of eight, three times a week over a three month period for thirty-three 45 minute language development sessions. The lessons included a wide range of activities presented visually and aurally which required the children to make associations by responding vocally or motorically. The total language age of the ITPA was used as a pre- and postmeasure of language changes.

Results: At the conclusion of the treatment period, the language gains made by the experimental group (6.75 months) were significantly greater than those made by the matched control group (—.44 months).

Comment: This study seems to demonstrate that significant language improvements can be made by intermediate age EMR children as a result of a specific language development program. However, since the language decreases made by the control subjects are not consistent with the findings of comparable investigations, it remains to be demonstrated whether the experimental group exceeded the control group because of the treatment or because the control group behaved atypically poorly.

Mueller, M. W., and Smith, J. O. The Stability of Language Age Modifications. *American Journal of Mental Deficiency,* 1964, *63,* 537-539.

Purpose: To determine the extent to which the language gains observed in the Smith study are stable over time.

Subjects: All 16 of the experimental subjects and 13 of the control subjects used in Smith's study (three had moved and could not be located for testing).

Procedure: The 29 subjects were administered the ITPA from 13 to 14 months after the time of original posttesting.

Results: The followup ITPA test results indicated that the groups no longer differed significantly in total language age. The mean followup gain for the experimental group was 4.44 months, while that of the control group was 8.06 months.

Comment: It is apparent from this followup study that the rate of language gain made by the experimental group during the three month treatment period the preceding year had decreased substantially after the treatment had been discontinued. This clearly demonstrates the need for a continuing language development program in special classes. However, since the control group had made such dramatic gains during the followup year, it appears that their language performance the previous year had been atypically poor. It is, therefore, not clear whether the particular language development program developed by Smith, or a Hawthorne effect, produced the significant difference which favored the experimental group.

Blessing, K. R. An Investigation of a Psycholinguistic Deficit in Educable Mentally Retarded Children: Detection, Remediation, and Related Variables. Unpublished doctoral dissertation, University of Wisconsin, 1964.

Purpose: To investigate the results of specific and individual language programing aimed at alleviating one area of linguistic deficit (Vocal Encoding, the ability to express oneself in spoken language).

Subjects: Twenty experimental (mean IQ, 65.4; CA, 11-0; ITPA, 6-0; Vocal Encoding, 5-2) EMR Caucasian children enrolled in special classes, selected on the basis of receiving MA scores of 8-10 on an individual test of intelligence and of being at least one year below MA on the Vocal Encoding subtest of the Illinois Test of Psycholinguistic Abilities (ITPA). Groups were matched on the basis of ordinal position, sex, and paternal occupation. Subjects were eliminated on the variables of bilinguilism in the home, physical and/or sensory defects, and severe emotional maladjustment.

Procedure: The experimental subjects were given 45 one hour language tutoring sessions for three days a week over a 14 week period. The sessions were designed primarily to improve vocal encoding ability. Pre- to postmeasures included the ITPA Vocal Encoding and Binet vocabulary tests, as well as total word count, mean sentence length, and mean number of words in the five longest remarks obtained from the subjects' responses on a Children's Apperception Test stimulus card. A four month followup was conducted using the latter three measures.

Results: The pre- to postdata analyses indicated that there were no significant differences between the 11 months' language gain made by the experimental group and the 9 months' gain made by the control group on the ITPA; neither did the groups differ significantly on Binet vocabulary subtest scores. The experimental group exceeded the control group on the Vocal Encoding subtest of the ITPA and on total word count, mean sentence length, and the mean length of the five longest remarks. The latter three measures continued to favor the experimental group four months after the treatment had been discontinued.

Comment: This study seems to indicate that a short term language treatment program is ineffective for producing total ITPA language gains which are significantly greater than those made by a control group. Since significant language differences between experimental and control groups were demonstrated with traditional language measures, it is possible that the ITPA was not sensitive to the kinds of language gains made, or it may be that differences were not obtained because both groups were performing near the ceiling of the test.

In Review

The results obtained in the studies reported here, as well as those obtained by Stearns (1966), seem to indicate that a short term program of language development lessons, in and of itself, is not sufficient to bring about lasting improvement in the language functioning of retarded children. To be effective, language lessons must be supplemented with the supportive context of a total language development program implemented throughout the school day.

Productive Thinking. Since the publication of Guilford's (1959) paper on the structure of intellect, a wave of studies on the productive or creative thinking abilities of children has emerged. In the wake of this interest, a number of investigators have attempted to study the creative abilities exhibited by mentally retarded children. The majority of these studies have been comparative in nature; however, in a few instances attempts have been made to determine whether productive thinking ability in retarded children can be enhanced. The studies which follow are illustrative of these research efforts.

Smith, R. M. Creative Thinking Abilities of Educable Mentally Handicapped Children in the Regular Grades. *American Journal of Mental Deficiency,* 1967, *71,* 571-575.

Purpose: To compare the creative thinking abilities of EMR children with those of intellectually normal children.

Subjects: Forty-eight EMR fifth grade children (Kuhlmann-Anderson IQ below 80) were matched with 48 intellectually normal fifth grade children (IQ scores between 90 and 120) on the basis of sex, race, socioeconomic status, and school and classroom setting.

Procedure: The two groups were compared on 22 creativity factors derived from eight tests of creative thinking ability developed by Guilford and Torrance.

Results: The normal children significantly exceeded the retarded children on 12 of the 14 verbal creativity factors even when CA was not controlled (the EMR subjects were older than the normal subjects). There were no significant differences between the groups on the seven nonverbal creativity factors; however, when CA was covaried, six of the nonverbal variables tended to favor the normal subjects.

Comment: This study supports the contention that a certain minimum level of general intellectual functioning is necessary for verbal creativity to be manifested. The fact that retarded children are significantly less adequate on verbal than on nonverbal measures of creativity when compared with normal children indicates where to place intervention efforts for enhancing creative abilities of the retarded.

Tisdall, W. J. Productive Thinking in Retarded Children. *Exceptional Children,* 1962, *29,* 36-41.

Purpose: To compare the productive thinking abilities of EMR children in special classes with those of EMR children in regular classes and with those of intellectually normal children.

Subjects: Seventy-one EMR children ranging in IQ from 60 to 85, with 39 of these children in special classes and 32 in regular classes; and 23 intellectually normal children from similar socioeconomic backgrounds. All children were approximately eight years of age and had attended school for two years. The EMR subjects were those used in the Goldstein, Moss, and Jordan (1965) study.

Procedure: Three verbal and three nonverbal tests of productive thinking developed by Torrance were administered individually to each subject.

Results: No significant differences existed among the three groups on the nonverbal measures of productivity. On the verbal measures, the productive thinking scores of the EMR group in special classes were equivalent to those of the intellectually normal children, with both groups scoring significantly higher than the EMR children in regular grades.

Comment: These findings are in agreement with those reported by Smith (1967) above. Since no specific procedures for developing productive thinking were employed, it is not possible to determine whether the improved productive thinking of the special class children was due to the administrative grouping or to particular aspects of the special curriculum.

Rouse, Sue T. Effects of a Training Program on the Productive Thinking of Educable Mental Retardates. *American Journal of Mental Deficiency*, 1965, *69*, 666-673.

Purpose: To determine the effects of a training program designed to increase the productive thinking abilities of EMR children enrolled in special day classes.

Subjects: Experimental subjects were 47 EMR Caucasian special class children ranging in IQ from 58 to 78 (mean 69.2) and in CA from 7-5 to 16-0 (mean 12-3); control subjects were 31 EMR special class children ranging in IQ from 56 to 81 (mean 67.5) and in CA from 7-8 to 17-4 (mean 12-0). Other selection criteria included understandable expressive language and sufficient motor coordination to manipulate a pencil or crayon.

Procedure: The experimental children were provided 30 daily lessons, each approximately 30 minutes, for a period of six months. The lessons, designed to develop productive thinking abilities, included such activities as brainstorming, improvisation, and changing objects by adding, subtracting, or substituting elements. Pre- to posttest measures included one verbal (Product Improvement—toy dog) and one nonverbal (Circles Task) test of productive thinking abilities developed by Torrance.

Results: The mean gain scores made by the experimental group were significantly larger than those made by the control group on both the verbal and nonverbal measures of productive thinking ability.

Comment: This study shows that both the verbal and nonverbal productive thinking abilities of retarded children can be enhanced by a specific intervention program. However, it is interesting to note that the mean productive thinking scores obtained by the EMR group after treatment were equivalent to those obtained by Smith's (1967) normal subjects who were two years younger than subjects in this study.

In Review

These studies indicate that EMR children exhibit greater deficits in verbal as opposed to nonverbal productive thinking abilities. However, it appears that these deficits are amenable to specific remediation procedures. It has not yet been determined whether these gains can be maintained after the intervention period. Furthermore, there has been no evidence to indicate that the productive thinking of retarded children is sufficiently adequate to be manifested in improved academic performance, as demonstrated with gifted children, or in creative endeavors such as artistic or musical expression.

Multiple Intervention Strategies. There are several studies wherein a particular curriculum modification, or a combination of such modifications, is used to improve several, rather than one, aspects of school behavior. The studies which follow demonstrate the effectiveness of these approaches.

Blackman, L. S., and Capobianco, R. J. An Evaluation of Programmed Instruction with the Mentally Retarded Utilizing Teaching Machines. *American Journal of Mental Deficiency,* 1965, *70,* 262-269.

Purpose: To compare the gains in reading and arithmetic achievement of retarded adolescents using teaching machines to those gains made using traditional teaching methods, and to compare the in and out of school deportment of the two groups.

Subjects: Thirty-six institutionalized low educable retardates (mean IQ 54.3; mean CA 14.5, range 10 to 21 years) were assigned to experimental or control conditions. Groups were equated on reading and arithmetic achievement (mean reading grade was 1.4; mean arithmetic grade was 1.7).

Procedure: The following were administered as pretests and posttests: WISC, Metropolitan Achievement Tests, Wide Range Achievement Test, and a specially devised test of reading and arithmetic. Teachers rated the subjects monthly on the Behavior Rating Basal Scale. In addition, the subjects were observed once a month by a trained observer using a time sampling technique. Progress notes were kept of the child's in and out of school behavior. An attempt was made to control the teacher variable by assigning each of two teachers to both an experimental and a control group (morning and afternoon) and by exchanging assignments at midyear. The experimental classroom was equipped with five multiple choice teaching machines. Each child had approximately two hours of machine time per week in a 10 hour school week. Teachers had been instructed to cover the same materials and maintain the same pace with the control groups as with the experimental groups.

Results: As measured by the pre- and posttests, all groups showed significant improvement in reading and arithmetic achievement, but no significant differences were found between groups, except that the experimental group showed a greater gain on the specially devised arithmetic test. The time sampling observations indicated significant improvement in behavior for the experimental group, but this trend did not reach significance in the teacher observations. Control subjects did not show improvement in behavior.

Comment: In spite of the limitations in design discussed by the authors, two tentative findings emerge from this study: (a) conventional arithmetic may be more amenable to programing than reading; and (b) instructional methods may have significant implications for the behavior of the subjects, which is manifested in out of school as well as in school situations.

Bijou, S. W., Birnbrauer, J. S., Kidder, J. D., and Tague, Cecilia. Programmed Instruction as an Approach to Teaching of Reading, Writing and Arithmetic to Retarded Children. *Psychological Record,* 1966, *16,* 505-522.

Purpose: To develop a motivational system for effectively strengthening academic achievement and appropriate classroom conduct; to develop programed procedures which aim to strengthen cooperative and industrious behaviors in young retarded "educable" children who previously have shown little or no academic progress and whose reactions to previous educational experiences often ranged from apathy to rebellion; and to develop programed instructional material (including teachers' manuals) for reading, writing, arithmetic, time telling, money handling, and other practical subjects.

Subjects: Twenty-seven subjects participated in the core program for one to three years. Twenty-four subjects were residents at Ranier School; three resided at home. Mean CA was 11 years, with a range of 8-7 to 14-9; mean IQ was 63, with a range of 39 to 93. Subjects included were brain damaged, mongoloid, cultural-familial, and/or undifferentiated. Academic achievement of children entering the program ranged from upper first grade down to "not measurable." Subjects exhibited various forms of extreme classroom behavior problems.

Procedure: A classroom laboratory was designed to permit the children to work individually. An initial unsuccessful attempt to control classroom behavior was replaced with a token (gummed stars, "marks," and numerical scores) system of reinforcement, plus "time out" and ignoring by teacher for unacceptable behavior. Teacher attention to individuals was gradually decreased from complete and constant supervision to almost complete independence on the part of the child. Assignments were gradually changed from very short, constantly reinforced lessons to longer assignments involving considerable delay of reinforcement.

A sequential academic program of reading, writing, and arithmetic suitable for individual instruction was developed. An attempt was made to correlate the subject areas with each other. The reading program consisted of a sight vocabulary program (based on common preprimer and primer words), a comprehension program designed to teach the meanings of the words in the vocabulary program, and a phonetic sequence for the teaching of selected phonetic material. Writing was taught by illuminated tracing and copying materials. The arithmetic program progressed from matching dots with numerals and counting through simple addition, telling time, etc.

Programs were continually reevaluated and revised on the basis of the children's performance. Extensive use was made of operant conditioning techniques such as discrimination training, fading, and shaping procedures.

Results: No statistical treatment of any data is presented, nor is there any indication of a control group. However, it is reported that about one-third of the children reached complete independence in study habits; three children worked independently in less than a year, one child required a year and a half for the development of independent study skills, and some of the children were dismissed from the program before attaining complete independence.

Comment: The lack of a conventional presentation of data notwithstanding, this major study is included for review here because of the successful development of techniques for dealing with the multiproblem child—the retarded nonachiever with behavior problems, the child who is summarily dismissed from most studies with a note that "no children with severe behavior problems were included." While the study offers no evidence that the methods employed are superior to other methods (no control group), it does indicate that a program designed to deal simultaneously with behavior and achievement problems can be useful with the multiproblem child.

Dunn, L. M., and Mueller, M. W. The Effectiveness of the Peabody Language Development Kits and the Initial Teaching Alphabet with Disadvantaged Children in the Primary Grades: After One Year. *Institute on Mental Retardation and Intellectual Development* (IMRID) *Science Monograph,* 1966, No. 2.

Purpose: To investigate the efficacy of the initial teaching alphabet (ita) and the Peabody Language Development Kit (PLDK) with underprivileged first grade children under several treatment conditions.

Subjects: Two hundred sixteen disadvantaged first grade children (mean Binet IQ 84.55) who met the study criteria for cultural deprivation were randomly selected from a pool of 732 subjects and assigned to one of four treatment groups of 54 each (27 boys and 27 girls).

Procedure: Group I received beginning reading instruction in ita, Group II received the PLDK plus Houghton Mifflin basic readers, Group III received ita instruction plus the PLDK, and Group IV received only Houghton Mifflin basic reader instruction. Pre- and posttest measures included the Stanford-Binet, the Peabody Picture Vocabulary Test (PPVT), and the Illinois Test of Psycholinguistic Abilities (ITPA). Additional posttest measures included the Metropolitan Achievement Test (MAT) and the Peabody Language Production Inventory (PLPI).

Results:

Academic Achievement—Children learning to read in ita did significantly better in school achievement than those learning to read by the basic readers alone or in combination with the PLDK. The addition of the PLDK to ita instruction did not significantly improve academic achievement.

Language—Children taught with the PLDK lessons made significantly greater gains in overall language functioning as measured by the ITPA; however, only when the PLDK was used in combination with the ita was there a significant gain in language production as measured by the PLPI. The PLDK did not significantly affect hearing vocabulary as measured by the PPVT.

Intellectual Development—Groups taught by PLDK in combination with ita made significantly greater IQ gains (9.24) than groups taught by PLDK alone (5.80), ita alone (4.34), or groups receiving neither of the experimental approaches (6.00). However, an interaction effect indicated that the combined approach had significantly facilitated the intellectual growth of the boys (IQ gain of 11.48) but had not significantly affected the intellectual growth of the girls (IQ gain of 7.00).

Comment: It is extremely interesting to note that although the PLDK instructed groups made the greatest language gains, these groups achieved as poorly on the standardized reading tests as the traditionally taught group. This finding once again demonstrates that modifications in one aspect of behavior do not necessarily transfer to other aspects of behavior. It seems reasonable to conclude that language improvement requires an intensive, specific language intervention program, while reading improvement requires an intensive, innovative reading development program.

Multiple intervention programs such as the ones reviewed above must be considered to be only in a developmental stage. Hence, the results reported here should be viewed as indicative rather than conclusive. It appears that the approaches reviewed here are sufficiently promising to warrant further development and refinement.

In Review

Studies comparing the school performance of retarded children with that of normal or brain injured children have decreased significantly over the past few years; instead, investigators have become more concerned with evaluating curriculum strategies for improving the school performance of these children. To state that the change in emphasis is a welcome one would be a gross understatement. No teacher working with EMR children needs to be informed of whether her children have fewer or more school problems than other groups of children. However, she does need well documented information about how she can best improve the school performance of these children. The paucity of such information should be of particular concern to teacher training institutions. If efficacy studies do not soon begin to demonstrate that special educational procedures for the retarded can be effective, we cannot expect local, state, and federal school agencies to continue to support these costly programs.

Variables Associated with School Performance

There may be several reasons why special administrative grouping and curricular modifications have not shown themselves to be notably successful in improving the achievement and performance of retarded children. The groupings and modifications have often been made without regard for specific factors which are known to affect the performance of retarded children; teachers and others implementing the modified curricula or administrative groupings often have low expectations for retarded children and demand only minimal performance from them. Assessment techniques and measures used at present are often inappropriate and inadequate for measuring the performance and achievement of retarded children. This section will consider some of the variables which are relevant to the way retarded children learn and achieve. No attempt will be made to provide a comprehensive overview of the vast but fragmentary literature on the learning of retardates. A limited number of studies has been selected for inclusion here on the basis of the importance of the problem under investigation, defensibility of methodology, and the significance of implications for educational practices.

While it may be true that certain attributes are characteristic of groups of retarded children, it is important to emphasize the tremendous variability in children who obtain low scores on intelligence tests. This variability in performance, exemplified in the following two studies, should be kept in mind throughout this section. Retarded children represent a group that is heterogeneous with respect to specific abilities, motivational patterns, learning styles and strategies, and social histories. Hence, any serious attempt to elicit maximal achievement from a given child, while deriving benefit from what is known about retarded children generally, will be tempered on the basis of knowledge of the specific child's response patterns and performance level.

Jensen, A. Learning Ability in Retarded, Average, and Gifted Children. *Merrill-Palmer Quarterly,* 1963, *9,* 123-140.

Purpose: To study the learning ability of retarded, average, and gifted children on a task that is equally unknown to all the subjects and for which all the subjects understand the instructions.

Subjects: Thirty-six retarded children in special classes, IQ range 50 to 75, mean IQ 66.17, mean CA 14.24; 24 average children, IQ range 90 to 110, mean IQ 103.04, mean CA 14.23; 13 gifted children, IQ's of 135+, mean IQ 142.54, mean CA 14.29. All subjects attended the same public school.

Procedure: Subjects were seated in front of an apparatus like a teaching machine and were required to learn by trial and error which of five pushbuttons on a panel corresponded with a colored geometric shape that appeared on a screen. Each button corresponded with one of five stimuli. After a correct response, a green light (reinforcement) went on until the next stimulus appeared. A series of 200 stimulus presentations followed the first reinforced response. Since some of the retarded subjects performed at a chance level throughout the 200 trials, four equivalent modified forms of the test were presented in the following order until the subject performed at better than chance level: (a) verbal reinforcement by the experimenter, (b) stimulus naming by the subject during pretraining, (c) stimulus naming by the subject during the actual learning, and (d) delayed presentation of the next stimulus after correct response by the subject. The final test given to all subjects was the same as the first test, except that the subject was required to learn six rather than five S-R connections. Performance on the first and last tests was measured by an "index of learning" (percentage of maximal possible performance above level of chance performance).

Results: On the first test, the gifted performed significantly better than the average group, and the average group performed significantly better than the retarded group. The last test indicated that the three groups still differed significantly, but the retardates had made significant improvement from the first to the last test. Tremendous differences were found in the variability in performances of the three groups, with the retardates being the most variable and the gifted being the least. High retardates (IQ 66 to 75) performed significantly better than low retardates (IQ 50 to 65). The correlation between IQ and learning on the last test (when all subjects understood the directions) was .35.

Comment: This study points out the fact that while IQ is a fairly good indicator of rate of learning (for this particular task) with average and gifted subjects, it is much less reliable as a predictor of rate of learning in retarded children. For example, four of the retarded subjects in the study learned faster than the mean performance of the gifted group. However, no average children were below the mean of the retarded group, and no gifted subject performed below the mean of the average group. It is evident that a measure of a retarded child's ability to learn certain materials could be an important adjunct to an IQ score in a comprehensive diagnostic assessment. Reliance on IQ alone may constitute a gross disservice to those retardates whose learning abilities lie in areas other than those tapped by traditional IQ tests.

Klausmeier, H. J., Feldhusen, J., and Check, J. An Analysis of Learning Efficiency in Arithmetic of Mentally Retarded Children in Comparison with Children of Average and High Intelligence. Madison: University of Wisconsin Press, 1959.

Purpose: To study the retention of arithmetic learning among children of low, average, and high intelligence when the original learning task is graded to the learner's achievement level. (The other hypotheses of this study will not be reviewed here.)

Subjects: Forty subjects (20 boys and 20 girls) at each of the following ranges of intelligence were randomly selected from various special and regular public school classes in the Madison and Milwaukee areas: Low (WISC IQ's from 55 to 80), Average (WISC IQ's from 90 to 110), and High (WISC IQ's 120+). No children of definite organic types such as mongoloid, or who exhibited severe secondary handicaps, were included in the sample. All subjects were of CA 8 to 9 years at the beginning of the study.

Procedure: Four learning retention tasks relevant to the above hypothesis were developed and administered to all subjects. The problems used were counting (by one's, two's, three's, etc.), problem solving, addition, and subtraction. For each task the present performance level of each subject in the particular task area was first determined so that the acquisition task presented to each subject was at an appropriate level of difficulty for that subject. Systematic intertask variations in the teaching-learning procedures were introduced —continuous or partial reinforcement, learning to criterion or overlearning permitted, score as to number correct or time required for learning, limited versus unlimited time for retention, and transfer or retention of material learned. Children were given specified help during acquisition to ensure some degree of learning. After the acquisition task, the subjects listened to music and conversed, etc., for five minutes, and were then given the retention test. Further tests of retention or relearning were administered six or seven weeks later. As an example of the kinds of tasks used, the addition task is described: first the subject's level of performance was determined by giving him an addition test of progressively more difficult items, his working level being considered to be at the point at which he made two consecutive errors. He was then given a maximum of 17 minutes to learn 10 items at that level. The subject was given systematic help on each item if required. Criterion was one correct solution of each problem with no overlearning permitted. Immediately following the study period, again after a five minute rest period and once again after six weeks, the subject was required to solve the problems without assistance.

Results: Original learning (acquisition) scores were not shown to be equal for the three groups on the counting and addition tasks. Acquisition scores were not significantly different on the subtraction and problem solving tasks. However, on all four tasks, adjusted mean retention scores (with acquisition scores the covariate) were not significantly different for the three ability groups. This finding held for both the retention and transfer conditions of the problem solving task.

Comment: This study demonstrates that when meaningful, socially useful arithmetic tasks are graded to a child's present level of performance, retention scores are similar for children of low, average, and high intelligence. While low IQ children may acquire new material more slowly than children of average or high intelligence, they retain what is acquired as well as their brighter CA peers if the learned material is appropriate for them. An obvious and important implication for classroom teachers is the need to know the present achievement level of each child in each aspect of the curriculum. A diagnostic approach implemented through individual or small group work is indicated. The study also points up the wide range of performances at all IQ levels.

Acquisition and Retention. It has been shown that tremendous variation in performance between individuals is characteristic of retarded children. The preceding study by Klausmeier, Feldhusen, and Check (1959) also indicates that the performance of these children can be facilitated by providing learning problems that are appropriate for each child's level of functioning. There are several other variables known to facilitate acquisition and retention of knowledge. The following studies are included to illustrate the extent of influence which meaningfulness, overlearning, sequence of task arrangement, and length of task have on acquisition and retention.

Vergason, G. A. Retention in Retarded and Normal Subjects as a Function of Amount of Original Training. *American Journal of Mental Deficiency,* 1964, *68,* 623-629.

Purpose: To study the retention of paired associate material by normal and retarded adolescents under conditions of minimal learning and overtraining.

Subjects: Sixty-four retarded subjects were drawn from public school EMR classes, CA range 12-0 to 16-5 years, Binet IQ range 60 to 75, performing below average academic work; 64 normal subjects drawn from regular classes, CA range 12-1 to 16-4 years, Kuhlmann Finch IQ range of 90 to 110, judged by the teacher to be performing average academic work. Retarded and normal subjects were randomly assigned to one of four treatment groups—minimum performance learning with retention measured after one day or after 30 days, overtraining on learning task with retention measured after one day or after 30 days.

Procedure: A series of 13 response pairs consisting of slides picturing common objects from the Peabody Picture Vocabulary Test was presented to subjects individually. In the minimum performance condition, a slide was removed from the series after one correct response anticipation by the subject. For subjects in the overtraining condition, the criterion was five successive correct anticipations of an item before removal. Four groups of subjects were retrained to original criterion after one day; the remaining groups were retrained after 30 days.

Results: There were no significant differences between normals and retardates on trials required in original learning. Under conditions of minimal learning, normal subjects were superior to retarded subjects on measures of retention both after one and 30 days. There were no differences in retention after 30 days between normal and retarded subjects who had received overtraining on original learning.

Comment: This study is useful in indicating that adequate mastery of a learning task is a necessary condition for the improvement of retention in EMR children. Under conditions of minimal learning, retarded children exhibit difficulty in retaining what is learned; this difficulty can be modified with overlearning. It should be noted that the nature of the task used here was one in which both the stimulus and response items were part of the child's known repertoire, and thus learning and retention in this study consisted only in associating two already known responses.

Prehm, H. J. Associative Learning in Retarded and Normal Children as a Function of Task Difficulty and Meaningfulness. *American Journal of Mental Deficiency*, 1966, *70*, 860-865.

Purpose: To study the effect of differences in meaningfulness and task difficulty on the paired associate learning of retarded and normal children.

Subjects: Ninety-six retarded subjects randomly selected from upper primary, intermediate, and junior high public school special classes (CA range 106 to 188 months, mean 148.85 months; MA range 63 to 145 months, mean 107.98 months; IQ range 51 to 83, mean 72.89) and 96 normal children of comparable age also randomly selected (CA range 99 to 190 months, mean 142.85 months; MA range 108 to 225 months, mean 148.83 months; IQ range 93 to 140, mean 111.54). Twenty-four subjects within each group were randomly assigned to one of four treatment conditions: meaningful, low difficulty; meaningful, high difficulty; nonmeaningful, low difficulty; and nonmeaningful, high difficulty. No attempt was made to match subjects by CA or MA (MA was used as the covariate on the analysis of the data).

Procedure: Paired associate items used in each of the four groups consisted of the following:

1. Meaningful, low difficulty: six pictures of common objects from the PPVT paired with 98 to 100 percent association value consonant-vowel-consonant (CVC) trigrams from the Archer list.
2. Meaningful, high difficulty: same as above, except the list consisted of 14 pairs instead of 6 pairs.
3. Nonmeaningful, low difficulty: three pairs of nonsense, pictorial, stick figure stimuli paired with 2 to 10 percent association value CVC trigrams.
4. Nonmeaningful, high difficulty: same as above except six pairs of items instead of three pairs were used.

Subjects were tested individually by the method of adjusted learning. Lists were learned to the criterion of three correct responses to each item. Number of trials to criterion served as the dependent variable.

Results:

1. The performance of the normal subjects was significantly superior to that of the mentally retarded subjects.
2. At the high difficulty level, the meaningful paired associates were learned by the normal subjects in significantly fewer trials than the nonsense paired associates.
3. Meaningfulness exerted no statistically significant effect on the performance of the retarded subjects.
4. A significantly higher number of trials was required to reach criterion on the high difficulty list than on the low difficulty list for both groups of subjects.

Comment: The finding that meaningfulness exerted no significant effect on the performance of retarded subjects is contrary to previous findings and interpretations. This lack of significant differences may be ascribed to (a) the irrelevance of the meaningfulness dimension or (b) the inappropriateness of the Archer list of CVC trigrams as a valid index of meaningfulness with young retarded subjects.

House, Betty, J., and Zeaman, D. Transfer of a Discrimination from Objects to Patterns. *Journal of Experimental Psychology*, 1960, *59*, 298-302.

Purpose: To compare the efficiency of discrimination training of trainable retarded children in an easy to hard sequence of discrimination problems, with training occurring on a series of hard discriminations, and when the final discrimination to be learned is the difficult one.

Subjects: Sixty subjects, MA's 2 to 6, randomly selected from classes in an institution. Three groups were equated for CA, MA, and IQ: For Group I, *N* was 19, mean CA 128 months, mean MA 47 months, mean IQ 39; for Group II, *N* was 22, mean CA 136 months, mean MA 53 months, mean IQ 41; for Group III, *N* was 19, mean CA 132 months, mean MA 53 months, mean IQ 41.

Procedure: The final discrimination to be learned by all groups was a difficult two dimensional pattern. Group I was given up to 500 trials for the learning of this pattern. Group II was first given up to 250 discrimination trials on three dimensional objects which employed the same form and color as the pattern, then given up to 250 trials on the pattern itself. Training for Group III was the same as for Group II, except that the first 250 trials were on objects employing colors and forms different from that of the pattern.

Results: Although all groups showed improvement over training trials, both of the easy to hard sequences (Groups II and III) were significantly more efficient than the series of hard discrimination trials only, as measured by total trials required to learn the hard discrimination. Training that employed relevant cues identical in object and pattern (Group II) was more efficient than that using different colors and forms for object and pattern (Group III). Within 10 training days, 68 percent of Group II had learned both the object and pattern problem, compared to 45 percent of Group III and only 10 percent of Group I.

Comment: Although perhaps the major contribution of this study is toward the development of a theory of discrimination learning, it has very real implications for the arrangement of learning situations for retarded children. The findings clearly indicate that extended practice on a difficult problem (in this study up to 500 trials) may lead to very little learning. A realization of this fact is especially important in view of the widespread belief that retardates learn best with extensive repetition and drill on the problem to be learned. A much more efficient procedure, as shown here, is to provide initial training on a similar but less difficult problem and then to switch to the more difficult. Maximal transfer is shown to be facilitated when the original easy problem is very similar (in the sense that it incorporates the same relevant cues) to the later difficult problem.

House, Betty J., Smith, Miriam, and Zeaman, D. Verbal Learning and Retention as a Function of Number of Lists in Retardates. *American Journal of Mental Deficiency,* 1964, *69,* 239-243.

Purpose: To examine the effect of number of paired associates lists on the acquisition and retention of retardates.

Subjects: Twenty-three randomly selected institutionalized retardates with MA range of 48 to 92, mean MA 77 months; IQ range of 30 to 72, mean 52; CA range of 101 to 196 months, mean 149 months.

Procedure: Paired associate items used consisted of two pictures on cards, the stimulus picture on each card being that of a child or adult and the response picture being that of a common item of food. Subjects were pretested for ability to verbalize response items. During training, subjects were presented with 10 series of five paired associate cards each randomly selected from a pool of 70 cards. Trials were continued on each series to a criterion of two consecutively correct responses.

Results: Subjects demonstrated poor learning performance until they reached the third series. They then showed significant improvement through the tenth list. Recall scores after 24 hours or more showed a decrease as a function of number of lists already learned with 86 percent of the associations recalled from the first list but only 43 percent of the associations recalled from the last list. The greatest decrement occurred in the first four lists, with some leveling off after that.

Comment: This study has important implications for the arrangement of learning experiences in the classroom, particularly in such tasks as the learning of spelling lists, sight words, or other material in which there is little logical relationship between the various units of the course. The finding that acquisition improves (presumably as a result of learning set) over a series of verbal lists but that retention decreases (presumably as a result of proactive inhibition) over such a series suggests that measures should be taken by the classroom teacher to offset this cumulative retention decrement. Unfortunately it is not known at present how this can best be done. House, Smith, and Zeaman suggest overtraining of later lists or units as a possible solution. Another possibility that needs to be investigated is that of varying the context or procedures from one list to the next. It may also be possible for the classroom teacher to reduce the amount of verbal material that has to be learned in a rote fashion or to space practice periods throughout the day in an effort to offset interference from previously learned material.

Conceptualization and Verbalization. The ability of retarded children has often been assumed to be most limited in tasks involving the higher mental processes such as concept formation and verbal coding.

Bryant, P. E. The Effects of Verbal Labelling on Recall and Recognition in Severely Subnormal and Normal Children. *Journal of Mental Deficiency Research,* 1965, *9,* 229-236.

Purpose: To discover to what extent retardates are limited in these abilities and to suggest ways in which performance in these areas can be improved.

Subjects: Sixty institutionalized trainable children (MA range 46 to 90 months, mean about 65 months) and 60 normal children (CA range 60 to 74 months, mean about 68 months). Half of the subjects in each group were tested by recall procedures and half by recognition procedures. Groups were matched in terms of the mean MA's of the retarded subjects and the mean CA's of the normal subjects. No IQ data are reported.

Procedure: Subjects were presented with 12 sets of three cards each. (Cards pictured common objects which subjects had been able to name during a pretest.) Each subject underwent two conditions, one in which the material was verbally labeled by the experimenter and by the subject when it was first presented, the other when it was not verbally labeled. Subjects who were tested by recall procedures had to recall and name six of the 12 sets of cards previously presented ("Can you tell me what were the pictures that I showed you just now?"). Subjects who were tested by recognition procedures had to recognize six sets ("Point to the pictures I showed you just now."), with the remaining six sets of cards being used as confusion material.

Results: Verbalization improved recognition in the normal subjects but not in the retarded subjects. However, verbal labeling improved the recall scores of both groups, but the extent of the improvement was greater with retarded subjects than with normal subjects.

Comment: This study makes it possible for teachers of the retarded to make more efficient use of verbal labeling procedures. Requiring the subject to verbalize his responses during the learning process is likely to improve his ability to remember the items when he is later called upon to name them. However, if the subject is later required only to identify or recognize the learned material, verbal labeling appears not to enhance his performance. Verbalization does not, in itself, strengthen memory processes in TMR children, but it facilitates the verbal coding required in a verbal response.

Milgram, N. A. Verbalization and Conceptual Classification in Trainable Mentally Retarded Children. *American Journal of Mental Deficiency,* 1966, *70,* 763-765.

Purpose: To study the nonverbal conceptual classifications and verbal formulation of concepts of trainable mentally retarded as compared to educable mentally retarded and normal children.

Subjects: Fifteen institutionalized trainable mentally retarded individuals with CA range of 10 to 24, mean 18.1 and Peabody Picture Vocabulary Test (PPVT) MA range of 3.5 to 6.8, mean 5.4. None of the TMR children were nonverbal. Sixteen special class educable mentally retarded children with CA range of 8 to 10, mean 9-2 and Wechsler Intelligence Scale for Children (WISC) MA range of 5.5 to 6.5, mean 6.1. Sixteen normal kindergarten and first grade children with CA of range 5.8 to 6.5, mean 6.1, judged by the child's teacher to be of normal intelligence.

Procedure: Task I: Subjects were shown 18 sets of seven cards picturing common objects, three of which belonged to a conceptual class by function, material, situation, or shape, and were asked which three "go together." If the child's response was incorrect, the experimenter said "no," and pointed to the correct cards. Task II: The three correct cards of each set were readministered and the subjects were asked to say in "what way these three go together."

Results: There were no significant differences among groups in performance on Task I. On Task II, the trainable retardates performed more poorly than the educable retardates ($p < .05$) and the normals ($p < .01$). An analysis of the data indicated the ability to correctly sort the items was not contingent at the time of sorting on an explicitly available verbalization.

Comment: In spite of the limitations of the matching procedures employed, this study shows that trainable retardates of MA 5 or 6 are able to conceptualize in a manner similar to that of their brighter MA peers, but that they are not as well able to verbalize the reasons for the conceptual classifications employed. It appears that trainable mentally retarded children exhibit a language deficit beyond what would be predicted on the basis of MA. Whether this is due to the retardation *per se* or whether it is a function of the unique social history (including institutionalization) of the retardates is not known at present. What is clear is that ability to conceptualize cannot be inferred from the verbalizations of TMR children since concept formation evidently occurs without the corresponding verbalizations. Reliance on what the child says rather than what he is able to do is likely to result in a gross underestimation of the extent of a TMR child's concept development.

Affective Variables. While continued efforts are being directed at investigations of the nature of assumed cognitive defects to account for learning and performance differences between MA matched retarded and normal individuals, increased attention is being given to the role of social history variables and motivational factors to account for such obtained differences. It has long been known that most retarded children come from families and social environments that cannot be considered comparable to those of typical middle class children of normal intelligence. This fact, together with the assumption that the retardate's inferior ability significantly alters the proportion of success and failure he experiences, has given rise to a body of literature investigating such variables as effects on performance of praise or reproof, effects of tangible or intangible rewards, imitative and conforming behaviors, and reactions to success or failure conditions.

Zigler, E., and de Labry, J. Concept-Switching in Middle Class, Lower Class, and Retarded Children. *Journal of Abnormal and Social Psychology*, 1962, *65*, 267-273.

Purpose: To investigate the effects of tangible and intangible reinforcers on the concept switching of middle class, lower class, and retarded children.

Subjects: Three groups of 22 children each were used—middle class children of normal intelligence, lower class children of normal intelligence, and institutionalized familial retarded children. Groups were matched by MA (mean was 81 months). Warner's scale was used to determine the socioeconomic status of the normal children. Mean IQ of the retarded children was 51 (Binet); mean IQ of the lower class children was 111 (Goodenough); mean IQ of the middle class children was 110 (Goodenough). Half of the subjects in each group were assigned to a tangible reward condition, half to an intangible reward condition.

Procedure: Two preliminary tasks were used to give the subjects experience with color and form classifications and to ensure that all subjects could make the necessary discriminations. On Task III, the experimental task, subjects were first required to classify the cards on the basis of either a color or form dimension, and then were asked to reclassify the cards in "some other way." Subjects were given seven trials, if needed, on the concept switch.

In the tangible reinforcement condition, subjects were given tokens for which toys could be traded. In the intangible reinforcement conditions, subjects were simply told "Right" after each correct sorting.

Results: Retarded and lower class children tended to switch concepts more readily in the tangible condition than in the intangible; the opposite was true for the middle class children. Middle class children switched more readily than retarded or lower class children in the intangible condition. No differences were found in readiness to switch when each group received what was, for it, the optimal reinforcement (tangible with lower class and retarded, intangible with middle class).

Comment: Evidence is presented in this study that (a) with proper motivation, lower class and retarded children perform as well as middle class children on some kinds of tasks, but (b) without the appropriate reinforcement, these children perform more poorly than middle class children. The poorer performance often demonstrated by retarded and lower class children may be a function of the inappropriateness of the reinforcement provided, rather than due to an inherent "lack of motivation" or some kind of cognitive deficit such as that postulated by the earlier Lewin-Kounin interpretation of rigidity in the retarded.

The generality of these findings in other kinds of problem solving situations should be explored, as should the questions of whether these results hold with older subjects (the normal children in this study were approximately six years old) and whether both tangible and intangible rewards maintain their effectiveness equally over a period of time. However, the generality of the findings do not have to be unequivocally established for the results of this study to be useful for improving the performance of lower class and retarded children.

McManis, D. L. Marble-Sorting Persistence in Mixed Verbal Incentive and Performance-Level Pairings. *American Journal of Mental Deficiency*, 1967, *71*, 811-817.

Purpose: To investigate the effects of verbal incentives (praise, reproof, competition) on children's performance in situations where the adult is interacting with two or more children together.

Subjects: Two hundred forty institutionalized mentally retarded adolescents, 120 boys (mean CA 16-2, mean MA 8-5, mean IQ 58.73) and 120 girls (mean CA 15-5, mean MA 7-2, mean IQ 50.67).

Procedure: Each subject was first instructed and tested in a neutral situation to establish baseline performance. Scores were then dichotomized and subjects were paired in four different ways depending on baseline performance: (a) both Subject 1 (S1) and Subject 2 (S2) were high performers; (b) both S1 and S2 were low performers; (c) S1 was a high performer and S2 was low; and (d) S1 was a low performer and S2 was high. Pairs in these four groups were further assigned to one of three treatment conditions: I—S1 received reproof, S2 received praise; II—S1 received reproof, S2 received competition; and III—S1 received praise, S2 received competition. Examples of the incentives used: Praise: "That is very good!" "Just keep trying"; Reproof: "That is not good enough," "You must work harder"; Competition: "Try to beat (partner)," "You had only_____right that time, but (partner) had_____right." There was no pairing of boys with girls.

The task itself consisted of obtaining marbles from a gumball dispenser and dropping them into the appropriately colored holes of a marble sorting board. Subjects alternated performing 60 second trials for a maximum of 25 trials each. Before each trial, the subject was informed by the experimenter as to how many marbles he had correctly sorted and he was told that he could continue the game or stop, as he wished. The criterion measure obtained was the number of 60 second trials performed before the subject voluntarily terminated his performance.

Results:

1. Reproof, when paired with praise, resulted in significantly less persistence than any of the other five incentive pairings.
2. Praise, when paired with competition, resulted in significantly more persistence than any other pairing.
3. Subjects receiving praise, when paired with a partner receiving reproof, performed significantly less well than when paired with competition subjects.
4. Subjects receiving reproof performed significantly better if their

partners were receiving competition incentives than they would have if the partner were being praised.

5. Subjects receiving competition incentives performed equally well regardless of whether their partners were being reproved or praised.
6. In reproof-praise groups, incentive means differed significantly in the high-low and low-high conditions, but they did not differ in conditions where both subjects were low or both were high performers.
7. In reproof-competition groups, the reproved subjects performed better than the subjects receiving competition only in the high-high grouping; otherwise the competition subjects exceeded their partners in persistence.
8. In praise-competition groups, praised subjects persisted longer than competition subjects in all four performance level pairings, but difference in length of persistence was significant only in high-high and low-low pairs.

Comment: The ordinary classroom has, in common with this study, the situation of one adult interacting simultaneously with two or more children. While considerable research has been done to investigate effects of reinforcement on an individual subject, heretofore little interest has been shown in investigating the effects on a subject of differentially reinforcing his peers. This study suggests that these variables do have a significant effect on the performance of the subjects. For example, a praised subject does not persist in a task as long when his partner is reproved as when his partner is encouraged to compete with him; the reproof appears to "spread" to the praised subject and to have an attenuating effect on his performance as well as on the partner who is actually receiving the reproof. The study also has implications for the grouping of children of varying performance levels. For example, when groups are heterogeneous with respect to performance level, reproof appears to attenuate the performance of the reproved subjects more than when the groups are homogeneous with respect to performance level. Thus, reproof is likely to have a worse effect on a retarded child in the regular grades than a retarded child in a special class where, presumably, the performance level is more homogeneous.

Wachs, T. D., and Cromwell, R. L. Perceptual Distortions by Mentally Retarded and Normal Children in Response to Failure Information. *American Journal of Mental Deficiency*, 1966, *70*, 803-806.

Purpose: To investigate the effects of failure stress on perceptual distortions of normal and retarded children.

Subjects: Twenty-two special class EMR children (mean CA of 11-5) and 22 normal sixth and seventh graders (mean CA 11-6) were matched on CA and approximate number of years in school. Subjects were screened by the Modified Locus of Control Scale and only those subjects who scored in the normal and above range were used. Half of each group was assigned to a failure condition, half to a nonstress condition. (No IQ data are reported.)

Procedure: Each subject was asked to observe a screen as letters were flashed on it with a tachistiscope, and to report which of the flashed letters appeared on a typed list that had been given to the subject. (Time was allowed between trials for the subject to refer to this list.) Letters flashed on the screen consisted of eight prime stimulus letters (which appeared on the typed list), eight distorted stimulus letters (which closely resembled the prime letters), and additional letters and forms.

Upon completion of the series, subjects in the failure condition were told that they had just been doing a test and had done very poorly, that they had not identified nearly enough of the letters on the typed list, and that they would have to repeat the test. Subjects in the nonstress condition were simply asked to repeat the series because part of the experimenter's apparatus had broken down. Perceptual distortion was scored as the number of times a subject substituted a distorted symbol for a prime symbol on series two, minus the times this was done on series one.

Results: Failed retardates indicated a significantly greater number of perceptual distortions than control retardates. No differences in perceptual distortions between failed and control normals were observed. Retardates in the stress condition demonstrated significantly more perceptual distortion than normals in the stress condition. No significant differences between retarded and normal children in the control condition were found.

Comment: It appears that under conditions of stress or threatened failure, retarded children are more likely to resort to "defensive distortion" in order to avoid failure than are normal children in similar conditions—that is, they are more likely to mistrust their own judgment as to what they are perceiving and modify their responses to agree with what the experimenter says they should be perceiving. These findings cannot simply be ascribed to the external mode of control commonly attributed to retardates, since all subjects had been screened on a locus of control scale. While comparisons with retarded children in the regular grades are not available, this study shows that special classes are not being successful in developing in these children a sense of confidence in their own ability and judgment. Although a certain amount of deference to adult authority figures may be necessary or even desirable for classroom control, it is obvious that the kind of conformity to adults demonstrated in this study is not in the best interests of the subjects. It is not possible to determine from the data presented here whether the obtained differences may be accounted for by social class differences in the subjects. What is perfectly clear, however, is that these children should be given specific assistance in the development of a confident belief in their own ability to make sound judgments.

Turnure, J., and Zigler, E. Outer-Directedness in the Problem Solving of Normal and Retarded Children. *Journal of Abnormal and Social Psychology*, 1964, *69*, 427-436.

Purpose: To test the hypothesis that the high incidence of failure experienced by retardates results in their employing an outer directed style of problem solving and that such outer directedness may be either detrimental or beneficial depending upon the nature of the total situation.

Study I

Subjects: Twenty familial noninstitutionalized retardates (mean CA 12.0, mean IQ 66); 20 children of normal intelligence matched to retardates on MA and sex (mean CA 8.1, mean IQ 100).

Procedure: Two experimental games were given to each subject; then a test game was administered followed by a third experimental game and a second test game. Half of each group of subjects was assigned to a success condition and half to a failure condition for the experimental games. The experimental games were so designed that subjects in the success condition could make only correct responses and subjects in the failure condition could make only incorrect responses. Success groups received verbal (e.g., "very good") and nonverbal (smiling, nodding) reinforcement from the experimenter; failure groups received verbal (e.g., "You aren't getting any right") statements of disapproval and no smiles, etc., during the experimental games. During the test games the experimenter showed neither approval nor disapproval in either condition. The first test game (Box Game) was designed to measure the extent to which the subject would imitate the behavior of a peer in selecting one of four boxes they believed to hold a prize; the second test game (Sticker Game) measured differences in the subjects' readiness to imitate the experimenter in making designs with gummed stickers.

Results: Retarded subjects were significantly more imitative than normals, and both retardates and normals were more imitative following a failure condition than following a success condition. Subjects who were imitative on one game tended to be imitative on the other.

Study II

Subjects: Twenty familial institutionalized retarded children (mean CA 13.6, mean IQ 55) MA matched with 20 normal children (mean CA 6.2, mean IQ 120). Ten subjects from each group were assigned to an experimental condition and 10 to a control condition.

Procedure: Two experimental games were employed—the first consisting of two WISC type object assembly tasks of equal difficulty, the second being a 20 square, two color block board game with 10 blocks. Throughout all tasks the experimenter maintained a neutral attitude to the subject, keeping interaction to a minimum.

In the experimental condition, while the subject was performing the first object assembly task, the experimenter seated beside him was assembling the other puzzle. Upon completion of his puzzle, the subject was then asked to assemble the puzzle the experimenter had just been assembling. In the control condition, the child completed both puzzles with the experimenter simply sitting beside him. In both conditions, the child's scores were computed on the basis of number of correct pieces fitted and time required. Also recorded were the number of times he glanced at the experimenter during the performance of the tasks.

Each subject was given a pencil and paper to "draw a man" (this was not scored). While the child was drawing, the experimenter unobtrusively placed the block board in front of himself. In the experimental condition, the experimenter proceeded fitting the blocks into the squares of one color. In the control condition, the experimenter simply waited for the child to finish his drawing. Each child was then asked to put the blocks into the form board in any way that he wished. Scores in both conditions were the number of glances of the child to the experimenter while the child was drawing, and the number of blocks placed in each particular color.

Results: In the experimental condition, the retardates performed significantly poorer than the normal children on the first puzzle but significantly better on the second. In the control condition both retarded and normal children improved their performance on the second over the first task.

On the block board task, retarded children in the experimental condition were significantly more imitative of the experimenter than normal children. Subjects in the control condition chose colors at chance levels.

Retarded children in the experimental condition were found to glance significantly more often at the experimenter than did the normal subjects.

Comment: This study provides a good alternative interpretation to the "distractibility" commonly attributed to retarded children—suggesting instead that the retardates' excessive dependence on external cues arises out of and is maintained by (a) an inordinate amount of failure in their reinforcement histories, and (b) the intermittent reinforcement provided by this particular style of problem solving—that is, occasionally it is an advantage to have attended to outside cues (as on the second part of the object assembly task). Since reliance on one's own cognitive abilities (as opposed to reliance upon external guidance) is assumed to lead to more efficient problem solving in the long run, it would seem to be a matter of some importance to reduce the outer directedness of the retarded child. Implicit in the study is the suggestion that this may be facilitated by a sequence of success experiences. The question deserves explicit investigation.

In Review

The fact that present teaching strategies with retarded children in current educational settings have, for the most part, not been effective should serve as an incentive for teachers to implement some of the findings reported here. It is recognized that (a) with the exception of the one by Klausmeier, Feldhusen, and Check (1959) the preceding studies have been laboratory rather than classroom oriented, and also (b) their applicability in educational settings remains an inference rather than a demonstrated fact. However, it is suggested that the evidence is promising enough for serious consideration by any individual who is responsible for the arrangement of learning situations for the retarded.

Teacher Expectations. The effect of the expectation of an experimenter on the outcome of an investigation has been documented by Rosenthal (1967). It seems reasonable to assume that if performance expectations exercise a significant influence in a well controlled laboratory situation, then the attitudes and expectations of teachers should be a major determinant of pupil performance in the classroom. A recent study by Rosenthal and Jacobson (1966) indicates that IQ gains of young children are significantly related to prior information given to the teacher when such information predicts IQ gains for certain randomly selected children. The following study investigated one aspect of how the expectation of a teacher is translated into actual performance differences in children.

Beez, W. V. Influence of Biased Psychological Reports on Teacher Behavior. Unpublished doctoral dissertation, Indiana University, 1968.

Purpose: To investigate the influence and effects of prior positive and negative information about pupils on the expectations of teachers and on subsequent teaching behavior.

Subjects: Sixty classroom teachers attending graduate summer classes at a university (CA range 19 to 51 years, teaching experience range of zero to 22 years) were randomly assigned as tutors to summer Head Start children (CA range 5-7 to 6-6, PPVT IQ range 55 to 127, mean IQ 91). Children had been randomly assigned to a low ability group or a high ability group. Each group consisted of 15 boys and 15 girls. None of the children had previously attended regular classes.

Procedure: A faked psychological evaluation folder for each child was prepared by the experimenter and given to each subject. Information contained in the folders was identical for each child except for name and age of the child and interpretation of IQ data. Each folder described the child as average in intelligence. However, folders of children in the "low ability" group interpreted this IQ information negatively, stressing the debilitative effects of cultural deprivation and the poor prognosis for school performance; folders of "high ability" children stressed positive aspects in the child's behavior and suggested that, despite cultural deprivation, the child was expected to do well in school.

Each subject was told that the purpose of the experiment was to see how well Head Start children would perform on a number of experimental tasks. Each subject worked individually with one child.

On the first task the subject was instructed to teach as many signs on cards (e.g., STOP, GO, WALK, BOYS, GIRLS, DANGER) to the child as she could within a 10 minute period, using whatever technique or strategy she wanted. During this task the experimenter recorded the time spent on each sign, the number of signs taught, and the responses of the child. The second task consisted of having the subject present a series of jigsaw puzzles to the child for a five minute period. (It was found in a pilot study that these puzzles presented no difficulty to the children and that they could solve them.) Following the puzzle task the subject was given selected pictures from French's Pictorial Test of Intelligence which had been separated into four difficulty levels. The subject received an explanation as to the difficulty levels and was asked to indicate the level at which she thought the child could successfully pass the items. During the time that the subject examined the cards, the child was retested by the examiner for retention of the signs that had been taught to him.

The subject was then asked to fill out a questionnaire, rating the child as to expected achievement, social competency, and intellectual abilities, as compared with children in a regular classroom.

Results: Significant differences were found between the two groups on all the measures. IQ of the child, teaching experience, or age of the subject did not appear to influence the data. The mean number of signs taught to the low ability group was 5.66, to the high ability group, 10.43. Children in the low ability group recalled a mean number of 3.07 signs, children in the high ability group, 5.9. On French's Test, subjects indicated a mean difficulty level of 1.33 for the low group and 2.67 for the high group. Although all subjects observed the children experiencing success on the puzzle task, significant differences were found between the groups in teacher expectation of achievement, social competency, and intellectual abilities.

Comment: This study clearly demonstrates that information predisposing a teacher to an expectation of either good or poor achievement on the part of the pupil affects the academic demands made by the teacher upon the child. Not surprisingly, the child who is presented with more material to learn actually masters more material. Interestingly, the IQ score itself does not appear to be a critical variable (all children were said to score within the normal range of intelligence). Rather, what appeared to determine the teacher's performance in this study was the report of the "psychologist" predicting either good or poor school performance for the child. If the teachers' demands on the children had been determined by the IQ score itself, one would have expected no differences between the groups.

The findings of the previous study may help to explain why retarded children in special classes who have obtained IQ scores identical to retarded children in the regular classes typically exhibit poorer academic achievement than the regular class children. Assignment to a special class for the retarded may carry with it the implication of a poor prognosis for school achievement, and, accordingly, the special class teacher may make only minimal academic demands upon the children. Since the children are not exposed to a great deal of material, they make small academic gains.

POSTSCHOOL ADJUSTMENT

Earlier postschool followup studies with the EMR were conducted primarily to demonstrate that such individuals lose their identity as retardates, becoming economically self sufficient and socially adequate members of society once they become adults. A few of these studies were conducted to demonstrate that special educational services were instrumental in helping the EMR attain successful adult adjustment. The results of most of these investigations have indicated that 80 to 85 percent of the EMR adults, indeed, make successful adult adjustments in unskilled and semiskilled occupations. However, these successful adjustments seem to occur regardless of whether the individual had received his education in special or regular classes. The major variable identified to date which seems to affect postschool adjustment is length of stay in school, with those dropping out at an early age (at CA 15 or 16) being less able to make a successful initial adult adjustment. However, according to the long term followup study of Baller, Charles, and Miller (1966), even these individuals eventually become successful members of society when compared with intellectually normal adults of a comparable socioeconomic class.

Postschool studies with TMR adults have generally found that approximately two-thirds of these individuals had remained in the community and that the other one-third had either died or been placed in a residential institution. Of those remaining at home, approximately 30 percent worked or had worked for pay, and approximately 75 percent had learned adequate self care skills and had developed sufficient social skills to get along unsupervised in their immediate neighborhoods. Again, these attainments seem unrelated to whether they did or did not receive special educational services. Since recent studies continue to produce similar findings, they will not be reviewed in this section. Instead, an attempt was made to locate studies which have contributed new insights into improving or understanding the postschool adjustment of EMR and TMR adults. Three such studies were located.

Dinger, J. D. Post School Adjustment of Former Educable Retarded Pupils. *Exceptional Children,* 1961, *27,* 353-360.

Purpose: To determine the effectiveness and needed modifications of a special education program for the EMR in Altoona, Pennsylvania.

Subjects: One hundred former pupils of the Altoona, Pennsylvania, special education program for the EMR (mean IQ 70.5, mean CA 27) who were employed and still lived in the community.

Procedure: The subjects were interviewed in their homes where their living conditions were observed; a history of their educational, military, occupational, marital, financial, community, and leisure time activities was elicited; and their opinions on, and suggestions for, the content of a proposed curriculum for the retarded were secured. In addition, a visit was made to each of their places of employment to analyze the jobs held by them in terms of employment procedures, job duties, required personal and academic characteristics, and the feasibility of such jobs for employment of future retarded pupils.

Results: Since the specific findings on the postschool adjustment of the subjects apply primarily to the Altoona program, they will not be presented in this review.

Comment: This study is one of the best examples in the literature of how a followup of former graduates can be used to improve a special education curriculum. The procedure of using only successful graduates as opposed to a random sample of all graduates is justifiable for this purpose because it increases the probability of obtaining valid criticisms and suggestions which can be used to improve the existing curriculum. It is highly probable that the inclusion of unsuccessful graduates would have increased the amount of criticism about the program, but it is just as probable that these criticisms would have been rationalizations to account for their poor adult adjustment rather than true criticisms of the program.

An innovative aspect of this study is the procedure of using analyses of the jobs of former graduates for determining the content which needed to be included in the work study program for secondary EMR children. If secondary work study programs for the EMR are to receive wider acceptance and support then they currently do, it is essential that such programs be continually evaluated and modified at the local level. National studies are necessary to obtain descriptions about the general adult characteristics of retardates as a group. Such information is extremely useful for convincing legislators to provide financial support for work training programs. However, only local studies can determine whether a given program is doing the job effectively.

Huddle, D. D. Work Performance of Trainable Adults as Influenced by Competition, Cooperation, and Monetary Reward. *American Journal of Mental Deficiency*, 1967, 72, 198-211.

Purpose: To determine the effects of competition, cooperation, and monetary reward on the work performance of trainable mentally retarded adults.

Subjects: Forty-eight TMR adult males (mean IQ 41.94, mean CA 27.44) residing on two campuses of an institution. One campus housed 24 experimental subjects who received monetary rewards; the other campus housed 24 experimental subjects who did not receive monetary rewards.

Procedure: Both reward and no reward groups were randomly divided into three subgroups of eight subjects each and designated as Individual, Competitive, or Cooperative subgroups. Individual subgroup subjects worked alone; Competitive subgroup subjects were randomly assigned to form four pairs, and the subjects in each pair competed with each other; Cooperative subgroup subjects were randomly assigned to form four pairs, and each pair of subjects worked as a team. The subjects in the reward subgroups received one cent for each successfully completed experimental task. The task was a 17 step assembly of a television rectifier unit. The subjects in the Individual and Competitive reward subgroups were paid for individual production; i.e., each subject received one cent for each task he successfully completed. Subjects in each pair in the Cooperative reward subgroup were paid on the basis of the average daily production of the pair; i.e., the total production of each pair was divided by two, and each subject received money (pennies) equaling one-half the total production of the pair. The same procedure was followed with the no reward group, except that subjects received no money for successfully completing the experimental task. A four week experimental period followed a two week training period. The subgroups met for 45 minutes daily, five days per week.

Results: The reward groups performed significantly better than the no reward groups; however, there were no significant differences in performance rate among the Individual, Competitive, or Cooperative subgroups.

Comment: The fact that almost all of the TMR subjects successfully learned to assemble a 17 sequence, five component task by the end of one 45 minute training period indicates that the capabilities of such individuals are often grossly underestimated. The study further points out that TMR adults, just as intellectually normal individuals, require incentives to enhance their work performance.

Edgerton, R. B. *The Cloak of Competence: Stigma in the Lives of the Retarded.* Berkeley: University of California Press, 1967.

Purpose:

1. To study the thoughts, feelings, and behaviors of retarded adults

as they themselves experienced, comprehended, and reported them.

2. To provide a reasonably detailed account of the life circumstances of these persons and the ways in which they perceive and manage their relative incompetence.
3. To study the crucial relevance of stigma and of passing as normal in the lives of these persons.

Subjects: Persons who had been graduated from the vocational training program of Pacific State Hospital between 1949 and 1958 and who had been discharged from the hospital at that time without further formal supervision from either the hospital or relatives. The group represented the upper stratum of the hospital's mildly retarded in terms of IQ, demonstrated social competence, and emotional stability. Of 110 potential cases, 12 could not be located, 45 lived too far away to make extensive interviewing feasible, two refused to cooperate, and inadequate data were obtained on three cases, leaving a total number of 48 (mean CA was 34.3, range of 20 to 56; mean IQ was 65.3, range of 47 to 85). The subjects were predominantly Caucasian.

Procedure: Data were collected by personal interview with the former patients, their friends, relatives, etc. Subjects were accompanied on visits to their relatives, on shopping trips, etc. The mean number of hours of contact per respondent was 17, with a range of from five to over 90 hours.

Results: Two of the subjects lived in middle class neighborhoods; the rest lived in a variety of lower class neighborhoods, slums, or transient settings. None owned their own dwelling, but some of the women expatients were married to normal men who did own their homes.

Six of the subjects were unemployed. Predominant among jobs held by the others were work in sanitoriums, kitchen work in restaurants, or housewives. Most had debts, little job security, and few marketable job skills.

Eighteen of the expatients were married to normal mates, 12 were married to other retardates, four were divorced, and 14 were single.

By far the most common leisure time activites of the subjects were conversation and watching television. Only one read for recreation.

None of the subjects had ever voted in any local, state, or national election. Three had been imprisoned at some time after release; six had been convicted of minor offenses. Thirty-two had received social welfare at some time after discharge from the hospital. Very few subjects ever attended church.

Only three subjects owned cars and these were not in working order. Only one had ever obtained a driver's license, and he did not own a car.

All subjects had rudimentary reading skills, but in many cases they were unable to read bus destinations, decipher signs, use a telephone, or react to newspaper headlines. By far the greatest difficulty was in the use of numbers. Without exception, subjects had difficulty in counting money, handling telephone and residence numbers, telling time, cashing checks, and/or purchasing items. None had a checking account.

Only three subjects were fully independent, the others depending to a greater or lesser extent on benefactors of normal intelligence, not only for help in the practical demands of life, but in assisting the expatient to see himself as normal (denial) and to help him "get by" with others as normal (passing). There was very little relationship between IQ and dependency or competency, even when IQ's in the 40's and 50's were being considered.

Major problems upon release from the institution were making a living and finding a mate, preferably one who was not an expatient. Marriage was seen by the subjects as a highly meaningful status.

Of the 48 subjects, 44 had undergone "eugenic" sterilization before release from the hospital. With very few exceptions, the subjects were highly resentful about this, considering it to be a permanent and visible mark of a secret and humiliating past.

All subjects believed their hospitalization to have been a mistake, and all had a "sad tale" to describe the "real" reason for their confinement. Reasons given for hospitalization, followed in parentheses by the numbers of subjects employing that reason, were "nerves" (2), mental illness (2), alcoholism (3), epilepsy (4), sexual delinquency (5), criminal offenses (5), physical illness (7), need for an education (8), and enmity or abandonment of relatives (12). Not one expatient admitted that he was retarded and that he had been rightfully institutionalized. Overwhelmingly, they gave the appearance of success in denying to themselves that they were retarded; instead they attributed their relative incompetence to the depriving experience of institutionalization.

Comment: This in depth study of the lives and thoughts of retarded individuals hopefully represents the beginning of a new kind of research with the retarded—research that goes beyond the mere quantification of trivial details that are called "community adjustment" or "self concept." This book has as its focus what it "feels like" to be considered retarded—to have officially and publicly been deemed lacking in basic human competency and to have been singled out and segregated (institutionalized) for that reason. It is highly significant that not one of the expatients admitted that he was retarded. This fact alone should invoke grave moral questions about the propriety of institutionalization itself. Similar questions should be asked about placing retarded children in special classes. Can an individual live with a conception of himself as retarded without destroying his concept of himself as fully human? The data presented in this book suggest that to be found wanting in mental capacity is the most devastating of all possible stigmata and that such a condition cannot be accepted by the self for what it is. In view of these findings, as well as of the fact that insufficient benefits have accrued to the individuals from such placement to make his adjustment to society more adequate, it appears that institutional placement for the educable mentally retarded should be avoided wherever possible. Clearly the study raises sensitive and controversial issues that strike at the very basis of current practices in the labeling and treatment of the retarded in our society. Further research is perhaps more urgently needed in this area than in any other.

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3

The Visually Impaired

William J. Tisdall

The amount of research which is being conducted on the education of the visually impaired appears to be increasing. This seems particularly true in the case of braille readers as opposed to large type readers. This chapter is devoted primarily to the results of studies on the visually impaired which have appeared since the review by Nolan (1963). No attempt is made here to include studies on learning disorders which are caused by problems of visual perception, since that topic is generally treated under other headings.

BRAILLE READERS

This section describes the results of selected recent studies concerning those children who, because of visual impairment, utilize tactile and auditory channels as primary communicative modes for educational purposes. Between January, 1960, and January, 1966, there has been an increase of 320 such children enrolled in public school programs, for a total of 8,823. (Incidence figures are based upon quota registrations filed with the American Printing House for the Blind, Louisville, Kentucky, January 3, 1966.)

Research areas are described in the following order:

1. Cognitive factors relevant to education.
2. Educational media and their uses.
3. Personality development and its measurement.
4. The multiply handicapped blind.

Cognitive Factors Relevant to Education

Studies on the cognition of blind children have, in the past, focused largely upon the auditory and tactile sensory input channels. More recently, attempts at studying the cognitive processes of these children have also included examination of the visual, as well as certain expressive, channels.

Barraga, Natalie. *Increased Visual Behavior in Low Vision Children.* American Foundation for the Blind, Research Series No. 13, 1964.

Purpose: To determine if the visual behavior of blind children having remaining vision could be improved significantly by a short period of specialized instruction with appropriate materials.

Subjects: Ten matched pairs of residential school blind children with remaining vision. Subjects were matched on their abilities to make visual discriminations of reading readiness items (on the Visual Discrimination Test). Ages ranged from 6 to 12, and Hayes-Binet IQ's were 80 or above.

Procedure: In each of the 10 matched pairs of subjects, one child received treatment while the other did not, thus comprising the experimental and control groups, respectively. Treatment consisted of 45 minute visual stimulation lessons daily, for a total of 30 hours of instruction over a period of approximately nine weeks. Lessons attempted to increase functional use of residual vision.

Results: Posttreatment testing revealed that the mean gain of the experimental subjects on the Visual Discrimination Test was significantly greater than that of the control group. Appreciable changes in near point acuity did not occur among the treatment group, although a few of these pupils made substantial gains in word recognition and reading achievement.

Comment: This study represents a landmark in the movement over the last two decades to promote increased functional use of vision. Stimulated by successful prescription and use of low vision aids, educators have been increasingly aware that visual diagnosis made on the basis of distance vision can sometimes obscure potentials for development of educationally useful near vision. This study represents the first documented demonstration that functional vision can be improved through training. The subsequent successful extension of the study by Ashcroft, Holliday, and Barraga (1965) confirms the potential of this approach. A much needed next step is development and validation of a broad range of materials for this purpose.

Harley, R. K. *Verbalism Among Blind Children.* American Foundation for the Blind, Research Series No. 10, 1963.

Purpose: To explore the relationship of verbalism among blind children to age, intelligence, experience, and personal adjustment.

Subjects: Forty children, blind from birth, randomly selected from age range of 6-11 to 14-3, from eight cottages of two residential schools.

Procedure: Each subject was seen individually, and the experimental procedure consisted of three phases in the following order:

1. Administration of selected words to obtain definitions, experience claims, and visually oriented verbalism scores.
2. Identification of items representing these words to determine verbalism scores.
3. Administration of the Tuddenham Reputation Test to secure adjustment scores.

Results: Analyses of data revealed that chronological age, intelligence, and experience were inversely related to verbalism, while no significant relationship was found between personal adjustment and verbalism. Visually oriented verbalism was also found to be unrelated to chronological age, intelligence, experience, and personal adjustment.

Comment: The question of verbalism, or the excessive use of visual terminology by blind children in the face of low levels of actual experience, is of long standing. This most recent research tends to confirm other recent findings that the extent of this problem may have been overstressed. Today, some educators imply that this is a false issue, and that in spite of lack of concrete experience, very young blind children can successfully deal with abstract material. This view, of course, stands in direct contrast to the insistence by educators on the necessity for broad ranges of concrete experience for blind children particularly in the preschool years.

Kenmore, Jeanne R. Associative Learning by Blind Versus Sighted Children with Words and Objects Differing in Meaningfulness and Identifiability without Vision. Unpublished doctoral dissertation, University of Minnesota, 1965.

Purpose: To test the hypotheses that tactual experience is maximized only for the young blind child, and that, as he progresses in school, verbal skills supplant tactual exploration and experience.

Subjects: Thirty blind children from grades 3 and 6 were matched with 30 sighted children on IQ, CA, sex, and grade.

Procedure: Seven paired associates learning tasks requiring use of different sense modalities were administered. The materials were classed as either familiar or meaningless. Blind subjects read both familiar and nonsense words in braille. Sighted subjects read them in print. Blind and sighted alike listened to both familiar and nonsense words which were recorded. Blind subjects handled familiar objects, random shapes, and tactually distorted objects, while sighted subjects viewed colored photographs of the same objects.

Results: With familiar materials, the sense modality used did not make a significant difference, except that blind sixth graders did significantly better than other groups on recorded words. With random shapes and tactually distorted objects, blind sixth graders showed the effects of reduced tactual experience by performing more poorly than any other group. With unfamiliar material, blind sixth graders did better than the other subgroups, who read or listened to recorded words.

The results support the general hypothesis that the education of blind children becomes more highly verbal as they move through the grades.

Comment: The results of this dissertation confirm the fears of the proponents of the concept of "verbalism." For the blind children in this study, educational experience appeared directly related to an increase in verbal skills and a decrease in tactile skills. The findings provided renewed emphasis for the often voiced plea for the maximization of real and concrete experiences in the education of these children.

Nolan, C. Y., and Morris, June E. Development and Validation of the Roughness Discrimination Test. *The International Journal for the Education of the Blind,* 1965, *15,* 1-6.

Purpose: To develop a test of reading readiness for young children who will use braille as their mode of reading. More specifically, to assess "... the development of ability to utilize the tactual receptors and hands in a coordinated fashion ...." The rationale for this test was that a person must be able to discriminate tactual stimuli if he is to learn to read by means of braille.

Subjects: One hundred forty residential school pupils comprised the group which was tested for purposes of item analysis. These children were either braille readers or potential braille readers and ranged in age from 71 to 170 months. The validation group consisted of 156 first graders and 81 second graders from various residential schools.

Procedure: The test was made up of sandpaper cards of various degrees of roughness among which the subjects were asked to discriminate.

The Roughness Discrimination Test (RDT) was administered for item analysis, sex difference, and age difference purposes. Predictive validity was established by comparing RDT scores obtained at the beginning of the year with reading test scores at the end of the year. Concurrent validity was determined by correlating RDT and reading scores at the beginning of the second school year.

Results: Validation data indicated that children who perform well on the RDT will tend to be successful in learning to read braille, while those who do poorly on the RDT are likely to be unsuccessful in learning to read braille. Thus, the Roughness Discrimination Test is established as a meaningful readiness test for blind children who will read by braille.

Comment: The development of this test represents the first formal effort to design a measure specifically related to reading readiness for braille. This is an area where much more work is needed. Essential to further progress are studies to reveal exactly what factors are related to growth of readiness to read braille and how these factors are interrelated. This information should provide a basis for writing specifications for development of specially designed and integrated readiness materials.

Tisdall, W. J., Blackhurst, A. E., and Marks, C. Divergent Thinking in Blind Children. Project No. OE-32-27-0350-6003, US Office of Education, 1967.

Purpose: To study the effects of visual deprivation upon divergent thinking in blind children when compared with visually normal children.

Subjects: Seventy-six residential school blind children, 76 day school blind children, and 76 day school sighted children between the ages of 10 and 12. Blind pupils had visual acuity of light perception or less. All subjects were of normal intelligence or above.

Procedure: Six verbal tests developed by Guilford and Torrance were administered individually to all subjects in order to assess originality, fluency of ideas, flexibility of thought, and the ability to elaborate upon a stated theme or idea.

Results:

1. The results of this study indicate that both sighted and blind subjects perform equally well over a total range of tests on verbal divergent thinking.
2. Differences found between the blind and sighted groups were attributed to the effects of loss of vision as it related to experience

rather than to inherent intellectual characteristics of the blind subjects.

3. No major differences exist between residential and day school blind subjects on tests of divergent thinking.
4. Very little relationship was found between school achievement and divergent thinking of all subjects in this study.
5. The thinking of both sighted and blind day school males tended to be more divergent than that of their female classmates. Similar differences were not found among the residential school pupils.
6. There is very little relationship between mobility and the divergent thinking abilities of blind children.

Comment: This study lends support to the notion that the inherent qualities of cognitive ability do not differ among sighted and totally blind subjects. It further supports the idea that experiential deprivation (in this case, caused by blindness) does affect a child's ability to produce thoughts or ideas which are divergent in nature.

Weiner, L. H. The Performance of Good and Poor Braille Readers on Certain Tests Involving Tactual Perception. *International Journal for the Education of the Blind*, 1963, *12*, 72-77.

Purpose: To investigate tactual perception skills of good and poor braille readers on certain tests.

Subjects: Two groups of 25 residential school children blinded at or before the age of 18 months. Groups were matched on the basis of MA, CA, and grade placement. One group was designated as good readers, while the other was made up of poor readers as determined by criteria based upon scores derived from Braille Form J of the Stanford Achievement Test, Paragraph Meaning Section.

Procedure: Six experimental tests of tactual perception were administered to both groups as follows: (a) simple sorting test, (b) simple figure background perception test, (c) simple matching test, (d) complex sorting test, (e) complex figure background perception test, and (f) drawing test.

Results: No significant differences were found between the groups on tests 4, 5, and 6. Scores obtained on the six tests of tactual perception were not related to MA, CA, IQ, or reading achievement.

Comment: The identification of perceptual factors related to success in braille reading has received intermittent, and often incidental, attention over the years. Unfortunately, as in the study just reviewed, the selection of measures of perceptual abilities used has often been based on visual analogies which, as is the case for the present study, have proved misleading. A logical behavioral analysis of the braille reading act would appear a much more fruitful basis for selection of measures.

In Review

The studies described above are indicative of the diversity of research needed in the area of cognitive development of blind children. Needs for additional research in this area are very great, for it is within this realm that critical differences between blind and sighted children exist which have very significant implications for education. Among topics needing study are concept development in the face of great reduction in the amounts of direct and vicarious experience and many aspects of tactual perception. The latter include such functions as the dimensions of texture, form perception, structure of gross perceptual fields, perceptual constancies, and perception of space.

Educational Media and Their Uses

The development of improved educational materials for the blind is a persistent need. New media are often an outgrowth of new knowledge concerning sensory and cognitive processes. The studies described below, however, might be viewed as attempts to investigate problems related directly to materials and their uses.

Foulke, E., Amster, C. H., Nolan, C. Y., and Bixler, R. The Comprehension of Rapid Speech by the Blind. *Exceptional Children*, 1962, *29*, 134-141.

Purpose: To measure listening comprehension by blind children as a function of word rate and of the kind of material heard, and to compare comprehension at various word rates with that obtained with the same material read in braille.

Subjects: Two hundred ninety-one braille readers of both sexes in the sixth, seventh, and eighth grades of 11 residential schools for the blind. No subjects had previously heard compressed speech.

Procedure: Literary and scientific materials of seventh grade level of complexity were presented in braille and on tape recorders at rates of 175, 225, 275, and 325 words per minute (wpm). A 375 wpm presentation of the literary materials was also made. A separate group of subjects was employed for each mode of presentation. The order in which the subjects in each group encountered the material was varied in order to control for practice effects. A 36 item, multiple choice test was constructed to measure comprehension.

Results: It was found that compressed speech presentations of both literary and scientific materials can be comprehended by blind students. This represents a considerable time saving over normal listening speeds as well as a significant increase in the speed of comprehension of educational materials over that which is read in braille. Specifically, it was found that there was no loss of comprehension of either type of material when listening to compressed speech up to 225 wpm. This is contrasted to typical recording rates of 175 wpm and the mean braille reading rate for high school blind students at 90 wpm. With scientific materials, there was no significant loss of comprehension through 275 wpm.

Comment: This study has very important implications for the modification of learning and study habits of, and practices for, blind children. It tells the educator that the traditional slow pace of the blind learner may be increased by 2.5 to 3 times the rate of braille. Although the assumption cannot be made that such auditory methods will replace braille, this study does strongly suggest the use of compressed speech as a mode of learning whenever feasible.

Jones, J. W. *Blind Children: Degree of Vision, Mode of Reading.* OE-35026, Washington: US Government Printing Office, 1961.

Purpose: To explore the relations between visual acuity, reading medium, grade level, and type of school enrollment for legally blind children.

Subjects: Legally blind children (14,125) enrolled in residential schools and local school programs in grades K through 12.

Procedure: The data were obtained from the American Printing House for the Blind, which in January each year registers all legally blind children in the United States. Data collection in this registration included name, state, school system, grade, visual acuities for both right and left eyes, and the reading medium employed by each child.

Results:

1. Less than 25 percent of the group were totally blind.
2. More than 60 percent had sufficient vision to be of practical use in their instructional programs.
3. More than 80 percent of the children reported with 20/200 visual acuity used print as their primary mode of reading.
4. Considerably more children in local schools than those in residential schools used print as their primary mode of reading.

5. Of the total, approximately 58 percent used braille and 38 percent used print as their primary mode of reading. The remaining 4 percent used both media.
6. More than 50 percent of those in the residential schools, as compared to about 20 percent of those in local schools, were listed as totally blind or only able to see light.
7. For all levels of visual acuity, residential schools appeared to stress braille as the reading medium, while local schools stressed print whenever possible.

Comment: The first documentation of the relationship between reading media and level of visual acuity was provided in this study. The impact of these findings provided impetus to the movement to increase use of functional vision described in an earlier comment. Specifically, the diminishing practice of requiring all legally blind children to read braille regardless of their functional vision was dealt a hopefully fatal blow.

Nolan, C. Y. Blind Children: Degree of Vision, Mode of Reading; A 1963 Replication. *New Outlook for the Blind,* 1965, *59,* 233-238.

Purpose: A previous study, using 1960 registration data from the American Printing House for the Blind on legally blind children, analyzed the relationships between degree of visual handicap and mode of reading. That study generated great interest in the topic and led to this replication which compares 1963 data with those obtained in 1960.

Subjects: Children were classified under the same 10 levels of vision for both studies. These levels ranged from 20/200 to total blindness. Subjects who were registered but did not fall under any of the 10 levels (e.g., blindness due to restricted visual fields) numbered approximately 450 out of 14,574 in the 1960 study, and 552 out of 17,110 in the present study.

Procedure: Comparisons were made of the following registration data for both studies: (a) distributions of degree of vision, (b) local and residential school registrants by degrees of remaining vision, (c) distribution of mode of reading by visual categories, (d) proportion of large type readers by visual level for local and residential schools, (e) proportions of braille readers by visual level for local and residential schools, (f) proportions of students reading both braille and large type in each visual category, (g) proportions of students in local and residential schools having vision of object perception or better and vision of light perception or worse, (h) modes of reading of students with vision of object perception or better in local and residential schools, (i) grade distributions of blind students and total enrollment in the US, (j) grade distributions of readers of print and braille and total enrollment in the US, (k) grade distributions of readers of both print and braille and total enrollment in the US, and (l) grade distributions for large type readers in local and residential schools.

Results: The major differences found from comparing the 1960 and 1963 data were:

1. There were 2,536 more children registered with the American Printing House for the Blind in 1963. Of these 2,072 were enrolled in local school programs, and 464 in residential schools.
2. The number of braille readers decreased 5 percent, while those listed as print readers increased 5 percent (between 1960 and 1963).
3. In 1963, 12 percent more residential school children possessing object perception or better were registered as print readers.
4. There was a 50 percent increase in legally blind students classed as ungraded over the three year period.
5. The accumulation of braille readers in kindergarten and grade one, which was so evident in the 1960 data, did not occur in the 1963 data.

Comment: The degree of impact of the movement to emphasize use of functional vision can be found in comparison of the results of this and the previous study. Over three years, the proportion of children registered by residential schools as braille readers was reduced by 12 percent. The dramatic increase in the number of legally blind students classified as "ungraded" presents a hopeful sign of the growing concern of educators of the blind for programs for blind children who are multiply handicapped.

Nolan, C. Y., and Morris, June E. The Japanese Abacus as a Computational Aid for Blind Children. *Exceptional Children*, 1964, *31*, 15-17.

Purpose: Previous research indicated that blind school children are at a disadvantage in arithmetic because of both inadequate computational techniques traditionally used by the blind and concomitant teaching techniques. Both the experience of Orientals and an American pilot study suggested that the abacus might be an efficacious computational tool for the blind. This study was an effort to explore empirically that possibility.

Subjects: Forty-two pupils (23 boys and 19 girls) from grades 7B through 9B at the Perkins School for the Blind. Age ranges were 144 to 199 months while IQ ranged from 82 to 135.

Procedure: A small (3 × 5.5 inch) Japanese abacus, or soroban, with 13 columns was used. Counters were small beads which could be held in place by friction, once positioned. Teachers were given one week of instruction in the use of the abacus prior to the training period. Subjects were pretested in arithmetic computation achievement using computational devices of their choice. Posttesting was conducted at four and eight month intervals after the beginning of the training period.

Results: Significant gains were found over the four month interval. It was concluded that the use of the Japanese abacus does enable braille readers to increase their accuracy and speed in arithmetic computation.

Comment: Though small in scope, this study represents a desirable model for educational materials research and development. Identification of an educational problem and logical and behavioral analysis of its cause suggested a possible solution, the soroban. A specially designed soroban was produced and tested. The successful outcome of this test has led over 10,000 blind students and adults to adopt the abacus as a calculating tool. Two instruction manuals specifically written for the blind have been published.

Rawls, Rachel F. Use of Braille and Print Reading Material in Schools for the Blind. *International Journal for the Education of the Blind,* 1961, *11,* 10-14.

Purpose: To study the most effective method of teaching visually handicapped students in residential schools for the blind.

Procedure: Fifty residential schools for the blind were sent questionnaires in order to determine general practices in the use of large type materials, visual aids, and other materials requiring vision. Other information sought included which students used visual materials as a main source of learning, whether braille and sight saving students were taught in the same classroom, and what the main source of supply for visual materials was. Forty-one schools responded.

Results:

1. There is an increasing tendency to determine whether a child is to be taught to read print or braille on the basis of the effective-

ness with which he uses his residual vision.

2. In most of the schools, printed and other materials are acquired from the American Printing House for the Blind.
3. Most pupils are being taught to use what vision they have and to use it for learning whenever they can.
4. In most cases, the decision to use print materials is made by educational personnel in consultation with an ophthalmologist.
5. Most schools teach braille reading first if the best reading, for a given child, is questionable.
6. The most effective method of reading for a particular child is a highly individualized reader.
7. The 41 schools were almost evenly divided on the effectiveness of teaching braille and large type readers in the same classroom. Many schools felt that the two groups should be separated until reading habits were firmly established.
8. Most schools felt that, in general, magnifiers and other visual aids possessed limited usefulness.

Comment: This state of the art type of research represents a useful method for identifying problems for future study. The results of the study point up concern for full use of remaining vision.

Rawls, Rachel F., and Lewis, Ethel E. Braille Writing in Schools and Day Classes for the Blind in the United States. *International Journal for the Education of the Blind,* 1961, *11,* 42-46.

Purpose: To study the most efficient methods of presenting braille writing to children.

Procedure: Thirty-four state residential schools for the blind and 37 day class teachers responded to a questionnaire. The total population from which these schools and day classes responded is not given. The questions asked of the residential schools and day class teachers concerned (a) the grade level at which beginning braille is taught; (b) apparatus used for teaching braille writing, and whether this apparatus was used for teaching all beginners; and (c) at what grade level various writing equipment is introduced.

Results:

1. In most schools and day classes (48, or 67.6 percent combined), braille writing was introduced in the first half of grade one.
2. In 92.9 percent of the schools and day classes responding, all beginners were taught to write on a braillewriter.
3. The fourth grade is the average grade level at which typing is introduced.

4. A majority of the day classes (24) and residential schools (20) introduced braille reading and writing simultaneously.

Comment: This is another state of art research whose findings reveal that, at long last, the confusing practice of teaching beginning braille readers to read in one fashion and then to write in a mirror image of that fashion is virtually extinct.

In Review

The study of educational media for the blind necessarily involves examination of educational goals in light of the capabilities of blind pupils. Such analyses are basic to the successful development of educational media and of appropriate methods for their use. For the first time, adequate resources are becoming available for this purpose. Stemming primarily from federal sources, this support is exemplified by the series of Special Education Instructional Materials Centers recently established by the support of the US Office of Education.

Personality Development and Its Measurement

Very few studies have been reported on this topic over the past four years. Yet, the subject of personality dynamics among the blind is still very much in need of investigation.

As with the measurement of intelligence, the formal evaluation of the personality of a blind person is a process which is constantly accompanied by elevated probabilities of the occurrence of error. The problem is further compounded by the subjective nature of personality assessment and the particular problems related to the establishment of the validity of instruments which purport to measure personal characteristics of blind persons.

Bauman, Mary K., Platt, H., and Strauss, Susan H. A Measure of Personality for Blind Adolescents. *International Journal for the Education of the Blind,* 1963, *13,* 7-12.

Purpose: To develop a suitable measure of personality for blind adolescents.

Subjects:

Group I: Three hundred students in residential schools for the blind and 150 students in integrated public and parochial school classes.

Group II: A total of 300 students, with 150 (75 girls and 75 boys) from residential schools and 150 (75 boys and 75 girls) from integrated classes.

Group III: (Normative Group): 140 girls and 152 boys in six residential schools and 70 girls and 80 boys in integrated public and parochial school classes.

Ages ranged from 13 through 18 years. The mean age for nonresidential girls was 14.87 and for nonresidential boys 15.76. The mean ages for residential students (both boys and girls) fall in between. Grade level ranged from 4 through 12. The mean grade for nonresidential groups was ninth and for residential was eighth. For a group of 175 boys and girls for whom IQ's were available, the mean IQ was 102.5 with an *SD* of 14.3.

Procedure: Teenage blind students were encouraged to talk freely in group settings to a psychologist about their emotional and adjustment problems. The group sessions were recorded, and inventory items were made directly from these recordings. Certain items from the Emotional Factors Inventory (EFI) which seemed applicable for teenagers were also used.

The final form of the Adolescent Emotional Factors Inventory (AEFI) consists of 150 items (10 subscales, 15 items each), and all items used differentiate significantly between the upper and lower 27 percent of scores for the particular scale of which the item is a part. The 10 subscales include measures of (a) Sensitivity, (b) Health Adjustment, (c) Social Competency, (d) Paranoid Tendencies or Attitudes of Distrust, (e) Morale, (f) Boy-Girl Relations, (g) Family Adjustment, (h) School Adjustment, (i) Attitudes Regarding Blindness, and (j) Validation.

Norms for the revised scale were based on the responses of Group III. Norms are provided for boys and girls separately.

Results:

1. Most of the interscale correlations were low, indicating that they measure different traits.
2. Test score differences between groups are not likely to be related to age.
3. No significant differences in average scores were found between 13, 14, and 15 year olds and 16, 17, and 18 year olds.
4. For seven of the subscales, there was a significant difference between the mean scores of residential and nonresidential school girls.
5. To some degree, qualities measured by the AEFI relate to those measured by the Wechsler Verbal IQ (—.43).
6. According to the authors, this inventory has been very useful in showing the need for counseling, pointing up problems, and helping administrators to work with children.

Comment: Examination of this study points up the importance of including in-depth assessment of validity and reliability when attempting to construct a measure of personality which is suitable for blind children.

Sadaki, I. Mother and Blind Child: The Influence of Child-Rearing Practices on the Behavior of Preschool Blind Children. Unpublished doctoral dissertation, Harvard University, 1962.

Purpose: To determine (a) if the behavior of blind children is different from that of sighted children of the same age, (b) if mothers of blind and sighted children treat their children differently, and (c) the relationships between the behavior of blind children and that of their mothers.

Subjects: Ten blind and 12 sighted children, ages three to six years, who were from white, Christian, intact families of average socioeconomic status.

Procedure: The behavior of the children was observed 20 different times for periods of at least five minutes. Records were made of behavior falling in the following categories: dominance, nurturance, succorance, submission, sociability, self reliance, responsibility, sociable aggression, and nonsociable aggression. These were then rated independently by two codes according to a complex procedure.

Results: Blind children had higher rates of self instigated acts directed toward their mothers in the categories of succorance and sociability as compared with sighted children, who had high rates of dominance and nurturance. Blind children's acts, in comparison with those of the sighted children, tended to be monotonous and repetitious.

Mothers of blind children tended to comply with about half of their children's succorant behavior, using refusing and ignoring as methods of noncompliance. Mothers of sighted children tended to comply either very much or very little with their children's succorant behavior and relied almost entirely upon refusal as the method of noncompliance.

Blind children tended to relate to their mothers' dominance with submission, to their aggression with sociable aggression, to their sociability with sociability, and to their ignoring with succorance. Sighted children tended to relate to their mothers' dominance with succorance, to their aggression with submission, and to their succorance with sociability.

Comment: This study is unique in that it is the first to attempt to compare mother child interrelationships for groups of blind and sighted subjects. Although the numbers of subjects studied and the varieties of behavior sampled were quite limited, the study has heuristic value in opening a new avenue for research.

In Review

Measures of personality of the blind may suggest courses of action in the management of the child. However, many of the problems requiring special "management" of the blind child have their origins in the very early interactions of parent and child. Much more research of these interactions is needed. It is of equal or greater importance to transmit currently available information about the development of blind children to parents in such a way as to diminish the frequency of problems arising in these children at adolescence.

The Multiply Handicapped Blind

Modern educational provisions for the blind have tended to include a greater number of programs and facilities for the blind child with additional handicapping conditions. Expanded programs for the multiply handicapped blind, within both residential and day schools, represent both a greater willingness of educators to admit these children and the development of more sophisticated methods for identifying and assessing the complexities of their educationally significant problems. The studies reviewed below are indicative of a burgeoning research interest in programs for these children.

Hartlage, L. C. Listening Comprehension in the Retarded Blind. *Perceptual and Motor Skills,* 1965, *20,* 763-764.

Purpose: To compare the listening comprehension of groups of both blind and sighted retarded children.

Subjects: Twelve blind and 12 sighted residents of a home for the mentally retarded were matched for age, sex, intelligence, and duration of institutionalization.

Procedure: Subjects listened individually to an 8.5 minute long recording of a fictional selection appropriate at the five year level of comprehension. The selection was interrupted four times to administer equal and appropriate sections of a 28 item comprehension test.

Results: There were no significant differences in comprehension between the retarded blind and retarded sighted groups. Correlations between comprehension scores and IQ were .75 for the sighted group and .87 for the blind.

Comment: While this is a pilot study in stature, it is indicative of a new and growing effort to undertake research on the multiply handicapped blind. This interest reflects the growth of educational programs specifically designed for such children.

Haspiel, G. S. Communication Breakdown in the Blind Emotionally Disturbed Child. *New Outlook for the Blind,* 1965, *59,* 98-99.

Purpose: To study the communication problems of emotionally disturbed blind children.

Subjects: Sixty blind, emotionally disturbed children ranging in age from 2 to 18 years.

Procedure: The subjects were given complete audiological, speech, and language evaluations. Ten had repeated language evaluations after approximately one year. Standard communication tests were used where possible. The information and data obtained were divided into (a) preverbal and early development data, (b) auditory function, (c) speech function, and (d) language and conceptualization.

Results:

Preverbal and early development

1. The blind emotionally disturbed child, unlike the blind child without other problems, showed no audio dependence on his environment.
2. By the age of five or six, most of the subjects used the auditory channel for social interaction. However, their listening was often inconsistent, and apparently they failed to hear unless motivated.
3. Very few of the subjects in the group demonstrated the "babbling" stage in their speech development. This stage was replaced by extreme vocal perseveration and echolalia. Usually until the age of six or seven months they demonstrated a prolonged period of reflexive verbalization which was followed by a stage of minimal vocalization.
4. Need state words were usually developed and used at about one and one-half years of age. The child also seemed to understand more than he could produce verbally.

Auditory function

1. The children were very difficult to test using conventional audiometric techniques. Information in this area was gathered primarily from observing the child's responses rather than from his actual test performance.

2. The functional aspect of audition is often impaired, although most of the children seemed to be normal in terms of audio capacity.
3. Their responses to stimuli, in general, were inconsistent and appeared only when they were highly motivated.
4. If motivated, the child seemed to have adequate auditory retention of nonverbal materials.
5. Localization, discrimination, and figure/ground function seemed to be normal.

Speech function

1. Two-thirds of the subjects had slight consonant and vowel distortions.
2. Voice quality, within the normal range, tended to be high pitched, unpleasant, and whiny.
3. Stuttering was observed frequently, especially under stress conditions.

Language function and conceptualization

1. Mentally retarded subjects showed a grossly deficient language structure.
2. Nonretarded subjects appeared to have adequate receptive and expressive language.
3. In general, the subjects had two systems of language, internal and external.

Comment: This is one of few detailed attempts to learn more about the emotionally disturbed blind child. The many variables studied illustrate the complexity of the topic and the need to examine several factors at once in order to draw meaningful conclusions.

Miner, L. E. A Study of the Incidence of Speech Deviations among Visually Handicapped Children, *New Outlook for the Blind,* 1963, *57,* 10-14.

Purpose:

1. To investigate the incidence of speech deviations among the visually handicapped.
2. To determine whether or not there is a correlation between speech disorder and type of visual loss and whether or not there is a correlation between speech disorder and types of educational placement.

Subjects: Elementary grade students ($N = 293$) from two residential schools for the blind. The students ranged in grade placement from kindergarten to the sixth grade; special classrooms for the mentally retarded and emotionally disturbed were included.

Procedure: The investigator conversed with the children, and he had them read and repeat control sentences or count. The speech deviations included problems of (a) articulation, (b) voice, (c) voice and articulation, (d) language, (e) stuttering, (f) cerebral palsy, and (g) cleft palate.

Results:

1. Ninety-nine (33.8 percent) of the 293 students were found to have speech deviations: (a) 24 percent had articulatory disorders; (b) 3.4 percent had voice problems; (c) 2.4 percent had language problems.
2. Thirty-three percent of the total braille group had speech disorders, as compared with 35.8 percent of the total sight saving group. (This was not a significant difference.)
3. There were 57 boys and 42 girls with speech disorders. There was a higher (although not significant) percentage of boys than girls within each deviation group.
4. The mean age of the students having speech disorders was 10.1 years, with the largest drop off in frequency of deviations occurring at age 11 years.
5. Of the 69 emotionally disturbed and mentally retarded students taking part, 31 (44.9 percent) had speech deviations.

Comment: An incidence of speech deviations among blind children that is approximately three times greater than that found among sighted public school children has serious implications for children who are particularly dependent upon vocal communication.

In Review

Blind and sighted children who are intellectually retarded appear to exhibit similar comprehension abilities. When blind children who are emotionally disturbed are compared with emotionally healthy blind children, certain differences in communication abilities might be found. The incidence of speech disorders in blind children of elementary school age appears to be much greater than that which is found in sighted children of the same age.

CONCLUSION

As the number of educational provisions for blind children increases, so does the amount of research which is conducted relating to their instructional programs. It is doubtful, however, that this growth results from a cause and effect relationship; rather, it is believed that more investigators are becoming interested in the many unsolved research problems in this field. This increased activity has not, as yet, led to a much needed coordination of research effort wherein basic, applied, and replication studies might be executed on the basis of priority of importance.

Recent studies have shown that certain cognitive abilities can be trained, thereby enhancing the blind child's overall learning style and capacity. Much of the individual improvement in cognition which has been shown involves a purposeful intervention into the child's limited range of background experiences. Maximizing the match between the educational programs and the child's perceptual capacities appears critical.

Although new educational media for the blind are being developed, there is still need for a great amount of research effort in this area where, in some cases, primitive devices are still used as major tools of instruction.

Assessment of the personal characteristics of blind children continues to be underscored with the difficulty of drawing conclusions that are based upon comparisons with sighted children. While such a goal seems desirable from the standpoint of developing normative information, the task of the researcher is compounded by the necessity of dealing with those complex variables which are affected by the lack of vision. This is an especially important consideration in the case of the multiply handicapped blind child.

In many of the areas mentioned above, the quality of research appears to be improving in a manner consistent with the development of improved sampling and methodological and analytical techniques. In the course of studying blind children, however, it is imperative that the logistics of the research process itself be a continuing subject of investigation.

LARGE TYPE READERS

This section describes a few selected studies of children who, because of moderate limitations of vision, typically use enlarged type materials as a principal medium of instruction. The children are commonly designated as partially seeing and are categorized by visual acuity which ranges from approximately 20/70 to 20/200.

Recent figures indicate that there are approximately 8,400 legally blind children who are receiving instruction in both residential and day schools in the United States and who primarily read large type.

(This figure was based upon quota registrations filed with the American Printing House for the Blind, Louisville, Kentucky, January 3, 1966.) This figure is believed to represent only a small portion of the total number of partially seeing children. Roughly two-thirds of those who are enrolled in formal classes for the partially seeing are in day school programs, while about one-third are found in residential schools.

Bateman, Barbara D. Reading and Psycholinguistic Processes of Partially Seeing Children. *Research Bulletin, American Foundation for the Blind,* No. 8, January, 1965.

Purpose: To determine how the performance of partially seeing children differs from that of seeing children on the Illinois Test of Psycholinguistic Abilities (ITPA).

Subjects: Ninety-three partially seeing children in grades one to three.

Procedure: Subjects were administered the ITPA, and their performance on each subtest was compared with the standardization group upon which the ITPA norms were established ($N = 700$).

Results:

1. Auditory Decoding Subtest—Contrary to the expectation that partially seeing children who usually are trained in oral work and listening activities would be superior to sighted children, no difference in performance was found.
2. Visual Decoding Subtest—The partially seeing children showed a clear and significant deficit in obtaining meaning from visual symbols. Evidence suggests that perception of the pictures was not a factor.
3. Auditory Vocal Association Subtest— A significant difference was obtained when groups were compared according to CA. However, when comparisons based on MA were made, the slight deficit for the partially seeing group was no longer significant.
4. Visual Motor Association Subtest—The partially seeing group was significantly below the sighted group on this measure of the ability to discern relationships between visual stimuli.
5. Vocal Encoding Subtest—As in the Auditory Decoding Subtest, the expected superiority of partially seeing children was not found, and the groups did not differ in their ability to express ideas verbally.

6. Motor Encoding Subtest—The mean group standard score on this measure of motor expression of ideas was significantly below that of the normative group. This subtest, more than any other in the visual motor channel, appears to pinpoint the nature of the visual channel deficit shown by this group of partially seeing children. The deficit in this area points to a lack of knowledge of an object's use. Such knowledge is usually gained from visual experience.
7. Auditory Vocal Automatic Subtest—As expected, no difference was found between groups in the ability to predict future linguistic events from linguistic structure or inflection.
8. Auditory Vocal Sequential Subtest—The partially seeing group did not differ from the sighted on this subtest, showing no "compensative superiority" in immediate auditory sequential memory.
9. Visual Motor Sequential Subtests—The partially seeing group's greatest deficit was found in the area of sequential memory for visual symbols. The nature of the test material decreased the possibility that this deficit was due to difficulty in visual discrimination *per se*. Limited visual span seemed to be a factor.
10. The ITPA profiles were examined in relation to IQ, grade, visual acuity, and eye conditions. When the group's profiles were divided into IQ's above 114 and IQ's below 84, the profiles were nearly identical, except that the low IQ partially seeing group showed a greater deficit in the auditory vocal association area. No relationship was found between grade level and performance.

Comment: When comparing partially seeing children with those from the standardization sample of the experimental edition of this new test, it was found that deeper probing into the psycholinguistic abilities of these children was possible. Such knowledge serves to explain, in more concrete terms, the effects of visual deprivation upon reading and language in pupils with moderate visual limitations.

Birch, J. W., Tisdall, W. J., Peabody, R., and Sterrett, R. School Achievement and Effect of Type Size on Reading in Visually Handicapped Children. US Office of Education Cooperative Research Project Number 1766. Pittsburgh: University of Pittsburgh, 1966.

Purpose: To investigate the school achievement of partially seeing pupils and to establish criteria for determining the appropriateness of type size to be used for special printed or enlarged instructional materials.

Subjects: Complete data were gathered on 903 fifth and sixth grade partially seeing pupils from 15 states and the District of Columbia. Sample size varied according to the type of analysis being performed. Attrition of subjects was found to be a substantial problem when studying partially seeing children (defined as visually handicapped pupils who "... can use enlarged ink print or limited amounts of regular print under special conditions as a major mode of instruction....").

Procedure: Descriptive data such as sex, age, visual handicap, intelligence, and years in school were obtained from teachers. Five equivalent forms of a standardized reading achievement test were administered by the teachers. Each form was in a different type size so that each subject was tested in 12, 15, 18, 21, and 24 point type, using a Latin Square pattern. The highest earned score on the five tests was considered the best type size for each subject, and a complete battery of achievement tests in the best type size was then administered to each child in the sample under both timed and untimed conditions.

Results: Numerous findings, both descriptive and experimental, were obtained from the extensive body of data which was collected in this investigation. Among the findings were the following:

1. In the view of the investigators, the most important finding was the marked degree of educational retardation discovered among partially seeing pupils.
2. No one type size could be considered superior for partially seeing children.
3. Although a best type size could be determined for individual subjects, no general relationship was found between reading speed and comprehension and best type size.
4. No relationship existed between reading speed and comprehension and degree of visual acuity.
5. Achievement test scores were not related to reading distance.
6. The predictive use of certain educational and medical characteristics of partially seeing children shows promise in determining the degree of type enlargement to use for instructional materials.
7. As a group, the partially seeing were found to have average intelligence.
8. Teachers stated that fatigue, need for rest periods, and restriction in eye use were the most common educational problems.
9. The pupils in this sample were markedly overage for their grade.
10. Teachers appeared to have less information about the vision of their pupils than is ordinarily considered necessary for understanding the pupils' needs.

Comment: Implications of this study for special education practices, vocational rehabilitation, teacher education, and research are significant. The study presents objective information which teachers might use to help themselves in making decisions regarding the appropriateness of type sizes to be employed with partially seeing pupils. The identification of logistics problems encountered in the large scale investigation of partially seeing children should assist researchers in avoiding similar difficulties in future research efforts. The extensive degree of educational retardation found among the subjects of this study presents serious implications for the teaching of, and administrative programing for, partially seeing pupils.

Mueller, M. W. Effects of Illustration Size on Test Performance of Visually Limited Children. *Exceptional Children,* 1962, *29,* 124-128.

Purpose: To evaluate the effect of different illustration sizes on test performance of visually handicapped children.

Subjects: Thirty-nine visually limited children from the Tennessee School for the Blind, Nashville City Schools, and Davidson County (Tennessee) Public Schools. Their ages ranged from eight to 16 years; IQ's ranged from 70 to 130; visual acuity ranged from 20/70 to 20/100 in the better eye after correction, with a normal visual field. All students used ink print.

Procedure: The students were divided into two groups: those whose visual acuity was 20/200 or less in the better eye after correction and those whose visual acuity was between 20/70 and 20/200.

Each student was tested twice with alternate forms (A and B) and plate size (5 × 7 inches and 8 1/2 × 11 inches) of the Peabody Picture Vocabulary Test (PPVT). All subjects were first tested on Form A of the test and then retested on Form B, but the order of administration of the two test sizes was random. The interval between the first and second testing ranged from two to three weeks.

Results:

1. For the group as a whole, scores were significantly (.01 level) higher on the test using the larger plates.
2. Students whose visual acuity was better than 20/200 showed only a slight tendency to score higher on the larger sized test.
3. Children with best corrected vision of 20/200 or less showed significantly higher gains in test performance when the larger plates were used.

Comment: A check on test reliability with the enlarged version might have added further strength to the conclusions. Furthermore, acuity levels alone are not always the best predictors of the most effective print size for a given examinee.

In Review

The three studies reviewed above indicate that partially seeing children exhibit deficiencies in certain psycholinguistic abilities, educational retardation, and a need for the use of special materials in some instances of the testing process.

SUMMARY

Research on the education of partially seeing children continues to be needed in several areas. The studies reported here represent only a few of the important topics which warrant investigation. With the growing number of classes for these children, researchers may be encouraged to further investigative efforts because of the greater availability of subjects.

References

Aschroft, S. C., Holliday, C. C., and Barraga, Natalie C. *Study II: Effects of experimental teaching on the visual behavior of children educated as though they had no vision.* Nashville, Tennessee: George Peabody College for Teachers, 1965.

Nolan, C. Y. The visually impaired. In S. A. Kirk and Bluma B. Weiner (Editors), *Behavioral research on exceptional children.* Washington: The Council for Exceptional Children, 1963. Pp. 115-154.

4

Hearing Impairment

William N. Craig

The handicap imposed by a significant hearing impairment sustained early in life can most readily be observed in the absence or restricted development of spoken language. Along with this oral language deficiency, the isolation from auditory stimulation restricts the rate of conceptual development and reduces the ability to relate effectively with society. The full impact of deafness must then be evaluated in terms of the hearing impaired individual's educational development, social adjustment, and economic self sufficiency.

The studies reported in this chapter are organized within the following framework:

1. Educational considerations.
2. Occupational assessment.
3. Psychosocial aspects of deafness.
4. Communication modalities.

EDUCATIONAL CONSIDERATIONS

Five topics have stimulated much of the research: (a) assessment techniques and instructional development of written language; (b) effects of preschool instruction; (c) effects of institutional living; (d) the school's role in family life education; and (e) programs for the multiply handicapped deaf group. Representative studies on each of these topics will be reviewed.

Assessment

Stuckless, E. R., and Marks, C. H. *Assessment of the Written Language of Deaf Students.* Washington: Office of Education Cooperative Research Project Report 2544, 1966.

Purpose: To describe and develop scoring procedures for compositions written by deaf students and to compare these measures to judgments of teachers.

Subjects: Nine hundred residential and day school students, ranging in age from 10 to 19 and having hearing losses of at least 70 dB in the speech range for the better ear.

Procedure: Subjects were asked to write compositions in response to a four picture sequence. Compositions were quantitatively judged by teachers and objectively scored by investigators with regard to composition length; sentence length ratio of class III, IV, and function words; type-token ratio; grammatical correctness; and spelling.

Results: The teacher judgments and scores on the six objective variables correlated positively with CA. Grammatical correctness, type-token ratio, and Type III, IV, and function words correlated highly with teacher judgments. Multiple regression equations were computed for these three measures, using teacher judgments as the criterion, to provide a method for evaluating written compositions of deaf students.

Comment: This study provides a base for assessing the written language skill of deaf students within this age group. Additional research in this area more closely related to the developmental aspects of written language should have important implications for educators.

Simmons, A. A. A Comparison of the Type-Token Ratio of Spoken and Written Language of Deaf and Hearing Children. *The Volta Review,* 1962, *64,* 417-421.

Purpose: To analyze differences between spoken and written language of deaf and hearing children and to relate these differences to chronological age.

Subjects: Fifty-four children in a school for the deaf and 112 subjects from regular schools. The groups ranged in CA from eight to 15.

Procedure: Each subject produced one spoken and five written compositions which were stimulated by six pictures, each consisting of four sequences depicting situations within the realm of the subjects' experience. Type-token ratios, a measure of vocabulary diversity, were computed. Four functional categories and lexical words were considered in estimating the type-token ratios.

Results: The hearing subjects produced higher type-token ratios than the deaf subjects in both written and spoken compositions. The spoken type-token ratios of the deaf group were higher than their written ratios. Word diversity differed within each group in all grammatical categories; the highest type-token ratios were in class II and class IV categories. The deaf group tended to have the same patterns as the hearing group, but with reduced ratios.

Comment: This study suggests a difference between the deaf and hearing subjects in vocabulary diversity based on restricted usage rather than class alterations. The reported differences in oral as opposed to written language flexibility for the deaf group may have some educational implications in terms of the development of learned response patterns. Caution should be observed in the use of the type-token ratio as an index of language sophistication. The reader should note the use of the type-token ratio by Stuckless and Marks (1966) in this chapter.

Stuckless, E. R., and Birch, J. W. Programed Instruction in Written Language for the Deaf. *Exceptional Children,* 1964, *30,* 296-303.

Purpose: Three studies were conducted: (a) to determine whether written vocabulary could be presented through programed instruction and what manner of response was appropriate; (b) to compare the effectiveness of programed and conventional instruction on the acquisition of written language skill by deaf children; and (c) to determine if written language errors of deaf adolescents could be extinguished through programed techniques.

Subjects: Students from one residential school for the deaf were used for the first study, and students from four residential and two day schools for the deaf (mean CA for 99 subjects was 10.3) were used for the second study. Two hundred fourteen students (mean CA was 17.0 and mean hearing loss was 78 dB in the speech range) from seven schools for the deaf participated in the third study.

Procedure: The pilot study was designed to test the use of programing techniques and response modes in order to determine the best approach to use with deaf children. This approach was then used in the second study, in which half of each class was given the programed instruction and the other half, serving as the control group, was taught in the customary manner. A linear type program was prepared utilizing the Fitzgerald Key as the language format and a vanishing technique in which succeeding frames removed cues. Twenty units, each composed of 21 to 24 frames, made up the instructional program.

For the third study, an analysis of specific errors in written language and the frequency of use of certain parts of speech was used as a basis for the preparation of programed booklets. The program was designed to reduce grammatical errors. Subjects were divided into three groups: one experimental group (group A) was given two programs each week for five weeks; another (group B) was given the programs at the rate of two a week for six months, with the emphasis on particular difficulties; and a control group (C) was taught in the conventional manner. Changes in language performance were assessed on the basis of a 70 item grammar test and a written composition.

Results: On the basis of the pilot study, it was decided that programed instruction would be appropriate for the deaf. The second study demonstrated that, although children learned under both the experimental and control conditions, the experimental group required only half the time to attain the same level of achievement as the control group.

In the third study, there was no significant difference between groups A and C in improvement in grammar, whereas group B scored significantly higher than the other two groups on the grammar test. The two experimental groups receiving the programed materials (single and repeated presentations) were significantly superior to the control group on the criterion of composition scores.

Comment: This research demonstrated the appropriateness of programed instruction for both instruction and correction of certain aspects of the written language of deaf students. It is interesting to note that, in spite of research which supports the value of programed instruction, educators of the deaf have not fully accepted the approach.

Craig, W., Carr, J., and Latham, I. Comparison of Two Methods of Teaching Written Language to Deaf Students. *American Annals of the Deaf*, 1964, *109*, 248-256.

Purpose: To compare the effectiveness of a natural language system developed by the investigators (the phrase unit approach for teaching written language skills to deaf children) and that of a structured grammatical approach utilizing Wing's Symbols on written language development.

Subjects: Twenty students at the Oregon State School for the Deaf. The mean hearing loss in the speech range for the better ear was 89.5 dB for the experimental (phrase unit) group and 81.8 dB for the control (Wing's Symbols) group, with 55 dB serving as the cut off point for both groups. Mean WISC performance scores were 100.9 for the experimental group and 99.9 for the controls.

Procedure: Subjects were ranked on the basis of a pretest of written language and assigned to three second grade classes on an odd/even basis. The experimental and control groups in each class were similar in both degree of hearing loss and intelligence. Both received daily instruction for six weeks. Subjects were evaluated at two week intervals with respect to verbal style, subject-verb concept, subject-verb correctness, phrase concept, phrase correctness, phrase variety, sentence correctness, partial plot, developed plot, and paragraph use. (The essential characteristics of the phrase unit method are: teaching language in phrases, use of narrative language, and controlled presentation and reinforcement of vocabulary.)

Results: The increments in written language were significantly greater for the phrase unit group.

Comment: Further research is needed to assess the advantages of the phrase unit approach.

Preschool

Craig, W. N. Effects of Preschool Training on the Development of Reading and Lipreading Skills of Deaf Children. *American Annals of the Deaf,* 1964, *109,* 280-296.

Purpose: To investigate the effects of preschool education on the achievement of deaf children in reading and lipreading.

Subjects: Two hundred forty-three children from two residential schools for the deaf, 151 of whom had entered school between the ages of 2-10 and 4-6 (preschool group) and 92 of whom had entered school between the ages of five and seven (nonpreschool controls). A minimum hearing loss of 60 dB for the speech range was a criterion for inclusion in the study. CA, MA, hearing loss, and sex were handled as covariates in the experimental design.

Procedure: The Gates Primary, Advanced Primary, and Survey reading achievement tests and a special lipreading test devised by the author (Craig Lipreading Inventory) were administered. The response measures were also correlated with sex, CA, MA, and hearing loss.

Results: With the one exception of word recognition in one of the schools, no significant differences were found between the preschool and nonpreschool groups in either reading or lipreading skill. Lipreading skill was found to correlate significantly with mental age.

Comment: This study, as well as the study by Phillips (1963) which follows, fails to support the expected advantages of early school admission for deaf students.

Of particular interest was the development of the Craig Lipreading Inventory. This measure of lipreading skill has been filmed and used in a number of recent investigations. By using a multiple choice picture response procedure and a carefully selected vocabulary, it is appropriate for use over a wide age range.

Phillips, W. D. The Influence of Preschool Training on Achievement in Language Arts, Arithmetic Concepts and Socialization of Young Deaf Children in Residential Schools. Unpublished doctoral dissertation, Columbia University, 1963.

Purpose: To determine (a) if deaf children who have had preschool training show higher levels of achievement in first grade than those who have not attended a preschool program, and (b) whether differences which might be found would tend to diminish by the fourth year.

Subjects: One hundred twenty children (ranging in CA from six to nine and in grades one to four) attending six residential schools for the deaf; each subject had a minimum IQ of 90 and a hearing loss of at least 70 dB in the better ear, sustained prior to the age of two. An attempt was made to rule out children with multiple disabilities. One half of the group had attended preschool and one half had not.

Procedure: The Metropolitan Achievement Test, Primary I and II Batteries, and a sociometric device were administered. The opinions of teachers regarding children's speech, language ability, and social adjustment were obtained.

Results: Significant differences were found favoring the first year preschool group in word discrimination, reading, and arithmetic, but there were no differences in the other measures. No significant differences were found between the groups at the fourth year on the variables of word discrimination, reading, and arithmetic.

Comment: When coupled with that of Craig (1964), this study throws doubt on the anticipated advantages of early school admissions as presently implemented in residential schools for deaf children. It is possible that either the instructional procedures employed are not adequate or that early advantages are cancelled through more traditional procedures used in the first years of the regular school program. Quite possibly, both influences are at work.

The weight of logic still suggests that early language stimulation, in some systematic form, should produce lasting results in language and language related areas. The reader should note the points of view concerning early language acquisition in other studies in this review.

Institutional Living

Quigley, S. P., and Frisina, D. R. Institutionalization and Psycho-Educational Development of Deaf Children. *CEC Research Monograph,* 1961, Series A, No. 3.

Purpose: To compare communication ability, educational achievement, and psychosocial adjustment of day and residential students attending residential schools for the deaf.

Subjects: One hundred twenty day and 120 residential students from six schools for the deaf. The groups were equated for CA (minimum of 11 years), IQ, age at onset of hearing loss, and time spent in school.

Procedure: Speech proficiency was measured by the use of PB words in a technique similar to Hudgin's. Speechreading was evaluated by means of the Utley filmed sentence test (Form A) and a fingerspelling test. The vocabulary tests from the Durell-Sullivan Reading Achievement Test (1937), Stanford Achievement Test, and Haggerty-Olson-Wickman Behavior Rating Schedules were also administered.

Results: The day students were superior to residential students in speech proficiency and speechreading. There were no significant differences in achievement. Residential students showed better adjustment, as measured by the rating scale, but this finding was largely contingent upon the relatively poor adjustment of the male day school subjects.

Comment: Although this study provides a significant contribution to the controversy regarding day versus residential education, it fails to come to grips with instructional differences related to both differences in instructional methodology and in environmental stimulation which may exist between a well constituted comprehensive program as a part of the residential or dayschool tradition. In other words, it is quite possible that differences may exist between these two settings and their concomitant programs that cannot be observed by selecting all of the students from the same setting—in this case the residential school.

Family Life Education

Withrow, F. B. ***The Development of a Sex Education Curriculum for a State Residential School for the Deaf.*** **Research Report. Washington: US Department of Health, Education, and Welfare, Office of Education, Bureau of Research, 1966.**

Purpose: To help the deaf child develop feelings of self worth and positive self concepts in the area of affectional relationships and general sexual attitudes through a learning experience provided within the framework of a residential school environment. The development of a suitable curricular vehicle was an integral part of the study.

Subjects: Forty-five children (15 each at the elementary, intermediate, and high school levels) who were students at the Illnois School for the Deaf formed the experimental group. A control group at a second residential school for the deaf was matched with the experimental group on the basis of age, sex, IQ, and achievement.

Procedure: A curriculum was developed which covered the areas of family living and social behavior expectations, dating, courtship, marriage, human reproduction, childbirth, and marital and financial adjustment to adult life. Educators of the deaf and consultants in sociology and social hygiene developed the curriculum during a six week workshop.

All groups did not receive the total curriculum, but only those parts which were judged appropriate for the selected age levels. The groups met once weekly during the 1964-1965 school year for discussions with teacher counselors in group therapy sessions rather than in pedagogical classes.

Results: There was a significant change between the pre- and posttest scores on a test developed by the author favoring the experimental adolescent and high school groups. No significant differences were found at the elementary level. The lack of change at the elementary level was attributed to the small sample, the small number of test items, and the simplicity of the test. There was an attempt to determine changes in attitudes in the members of the two older groups through an interview technique.

Two dissemination workshops were held to enable the staff to discuss the implementation of a sex education program in schools for the deaf. Forty-eight such schools were represented at one or the other of these workshops. The curriculum and materials developed are intended to serve as guidelines for the establishment of sex education programs in residential schools for the deaf throughout the United States.

Comment: This study demonstration project is the first major effort to develop an effective curriculum for sex education in residential schools for the deaf. Since both residential living and the communication problem imposed by deafness limit the acquisition of information and development of appropriate attitudes in this area, this set of guidelines should help to meet a significant problem in the school program.

Craig, W. N., and Anderson, P. E. The Role of Residential Schools in Preparing Deaf Teenagers for Marriage. *American Annals of the Deaf*, 1966, *111*, 488-498.

Purpose: To examine practices and attitudes of administrators of residential schools for the deaf regarding dating and social relationships, and family life education.

Subjects: Sixty administrators of residential schools for the deaf.

Procedure: A questionnaire was mailed to the administrative heads of all residential schools for the deaf in the United States; there was a 90.9 percent return.

Results: There was greater agreement among administrators regarding dating and social relationships than family life education. While 85 percent of the schools established plans for student dating, only 50 percent provided for formal sex education and only 36.7 percent offered assistance in selecting a marriage partner. Two-thirds of the administrators indicated that they were not aware of parental attitudes on these subjects.

Comment: The inadequacy of home-school communication in this area is pointed out in this study. It is surprising that most schools do not assist deaf students in identifying important considerations in selecting a marriage partner. Information on the genetic aspects of deafness would seem particularly relevant. The reader should note the study by Withrow (1966) in this area.

Altshuler, K. Z. Sexual Patterns and Family Relationships. In J. D. Rainer, K. Z. Altshuler, and F. J. Kallmann, (Editors), *Family and Mental Health Problems in a Deaf Population*. New York: Columbia University, Department of Medical Genetics, 1963. Pp. 92-115.

Purpose: To gather information regarding sexual knowledge, dating patterns, and marital adjustment; attitudes and preferences regarding family members; and child rearing practices of the deaf.

Subjects: The subjects were deaf persons residing in the state of New York. The number of subjects included was not constant in each of the areas of inquiry, but ranged from approximately 400 to 600 deaf persons.

Procedure: Subjects were interviewed by research workers trained in psychology and skilled in manual communication. Both attitudinal and objective information were obtained.

Results: Most subjects had acquired their sexual knowledge from friends; of those who did not obtain information in this manner, the females were more likely to have obtained the information at home and males were likely to have obtained it at school or from published materials. None of the deaf women and only a few of the deaf men reported any sex experience during school years; the experiences reported were more often homosexual in nature.

More than 60 percent of the students had not dated during their school years. The unmarried group was composed mainly of persons who reported having no dates or friends while in school. Two-thirds of the adventitiously deafened men, but only one-third of the congenitally deaf, were married. There appeared to be a positive relationship between adjustment to deafness, ability to communicate, and marriage. However, those who reported poor marital adjustment were at both extremes—the excellent communicators and the poorest communicators.

Eighty-six percent of the group expressed a desire to marry a deaf person; this group was thought to be more accepting of their own handicap. Persons with some higher education were more likely to want hearing rather than deaf offspring. The group seemed to lack information about the hereditary aspects of deafness and did not take this factor into consideration when selecting a marriage partner. Approximately 25 percent of the deaf parents reported at least one deaf child; they reported experiencing difficulty controlling their children, and they held higher educational goals for their hearing children than their deaf children. There was a tendency for deaf parents to equate unlimited potential with normal hearing in their children.

Comment: This study represents the most systematic approach to the area of family and mental health problems of the deaf which has been undertaken in recent years. Though the study was conducted in New York State, there is good reason to suspect that the findings would be similar in other areas of the country.

The investigators discuss the problems involved in research of this type, i.e., the influence interviewers and family members may have had on the responses.

This study is part of a continuing research program presently being conducted at the New York State Psychiatric Institute. A second report of this research, by J. D. Rainer and K. Z. Altshuler, is currently available under the title of *Comprehensive Mental Health Services for the Deaf* (1966).

Multiply Handicapped

Vernon, McC. Multiply Handicapped Deaf Children: A Study of the Significance and Causes of the Problem. Unpublished doctoral dissertation, Claremont Graduate School, 1966.

Purpose: To determine some of the major causes of the secondary handicaps found in deaf children and to characterize the handicap associated with these causes.

Subjects: All of the 1,468 deaf children who attended or who were given preadmission evaluations at the California School for the Deaf, Riverside, from 1953 to 1964. The subjects ranged in age from 3 years to 21 years. All subjects had a hearing loss of 65 decibels or greater in the speech range (500 to 2,000 cps) and resided in Southern California school districts.

Procedure: Five origins of deafness (meningitis, erythroblastosis fetalis, heredity, prematurity, and maternal rubella) received the most intensive study in the sample. The areas investigated were (a) prevalence of various etiological factors, (b) prevalence of multiple handicaps within etiological groups, (c) brain damage, (d) audiometric results, (e) emotional adjustment, (f) intelligence, (g) communication skills, and (h) educational achievement.

Results: The subjects were assigned to the five previously mentioned etiological classifications only if etiology was clearly established according to stringent definitions. The following percentages of causes were found: heredity, 5.4 percent; Rh factor, 3.1 percent; prematurity, 11.9 percent; meningitis, 8.1 percent; maternal rubella, 8.8 percent; unknown, 30.4 percent; other, 32.3 percent.

The genetic group had a low incidence of multiple handicaps (6.5 percent). The other four etiological groups studied had a much greater incidence of multiple handicaps (not including deafness): Rh factor, 71.1 percent; prematurity, 67.8 percent; maternal rubella, 53.8 percent; and meningitis, 38 percent.

All children could not be examined for brain injury in the same manner, and inferential statistical comparison of the groups was inappropriate because of age difference. However, the results of the Bender-Gestalt test and of a rating scale for the detection of brain injury showed that the genetically deaf had by far the fewest symptoms, that the meningitic and rubella groups showed a high incidence of symptomology, and that the Rh and premature groups showed a very high incidence.

Pure tone audiometry revealed mean hearing losses (in decibels) for the 500 to 2,000 cps range as follows: Rh, 76.3; Rubella, 82.3; Prematurity, 82.7; Heredity, 88.0; Meningitis, 92.6. Rubella, premature, and meningitic subjects had a high prevalence of maladjustment. The problems of all of the groups, with the exception of the hereditary group, are suggestive of organic origin.

The hereditary group had unusually high mean intelligence and no mental retardation was found in this group. The children in the other four etiological classifications had mean IQ's which were significantly below 100 and a greater incidence of mental retardation than would be found in a normal distribution. The premature group was found to be especially low and as a group did not attain a level which is considered minimal for success in the usual instructional programs of schools for the deaf. The hereditary group was markedly better than the other four groups in language ability. No significant differences were found between any of the five groups in speech or speechreading. The genetically deaf were superior to the other groups in every measure of educational achievement.

Rubella children had the lowest proportion of high achievement and the highest rate of failure. They were followed in these respects by the premature and Rh groups. Meningitic children were quite variable, having more than an average number of educational successes and also educational failures.

Comment: The results of this investigation of multiply handicapped deaf children should be extremely valuable both to those interested in the assessment of hearing loss and appropriate referral and to those involved in developing more effective instructional programs for the hearing impaired child. Certainly, continued study in this area is indicated in order to define more precisely the differences in educational potential of genetically and adventitiously deafened children.

The effects of early manual communication on language development investigated by Birch and Stuckless (1966) suggested that the early language system (the language of signs) permitted young deaf children to develop better language skills than the control or oral group. Since this study separates groups in a highly similar manner, it remains to be determined whether the mode of communication or the cause of deafness is the major operating factor.

The sampling problem may also be important. All of the students used in this study came from the same residential school for the deaf. Since the geographic area also has a number of day schools for the deaf, there may have been a selective factor in enrollment in a particular school. Support of this point of view might be found in the surprisingly high intelligence scores of the genetically deaf—considerably higher than normal sampling procedures would predict.

Despite these two questions, this study should serve as a basic point of departure for reexamining both evaluative procedures and instructional programs for deaf children.

Anderson, R. M., Stevens, G. D., and Stuckless, E. R. *Provisions for the Education of Mentally Retarded Deaf Students in Residential Schools for the Deaf.* Washington: Office of Education, US Department of Health, Education, and Welfare, 1966.

Purpose: To describe: (a) admission policies for deaf retarded children into schools for the deaf; (b) special instructional programs for these children; (c) teacher qualifications; (d) the prevalence of mental retardation among deaf children in schools for the deaf; and (e) administrators' judgments regarding the most effective instructional organization for this type of child.

Subjects: Personnel from 64 schools for the deaf (serving a total of 14,534 pupils), including 150 teachers of the retarded deaf. These schools represent 80 percent of the total number of residential facilities for the deaf in the United States.

Procedure: Inquiry forms were filled out.

Results: The prevalence of mental retardation among deaf children appears to be increasing, and most schools for the deaf provide special educational services for these students. Considerable uncertainty was expressed regarding instructional methods and goals for this group. The need for improved systems of nomenclature and educational classification for the retarded deaf, and problems relating to test construction and teacher training are pointed out by the authors.

Comment: This was particularly significant as a pilot study, containing suggestions for further inquiry into the problems of the retarded deaf.

***Programming Habilitation of the Hospitalized Deaf-Retarded.* Research Report: Number 44, Department of Mental Health, Lansing, Michigan, 1965.**

Purpose: This project was developed to examine four problems: (a) to identify and assess the characteristics of institutionalized deaf retarded, (b) to develop a training program for selected members of the group, (c) to provide appropriate vocational experience for the patients, and (d) to evaluate the effectiveness of various parts of the program.

Subjects: Deaf retarded patients in the Michigan State System of Institutions for the Retarded were assessed. Twenty-four of these patients were selected to participate in the training phase of the project. A group of eight patients was also selected to serve as controls.

Procedure: A thorough diagnostic assessment of all deaf retarded patients (speech and hearing, intellectual function, academic achievement, and medical) comprised the first phase of this project. The experimental group then received 18 to 24 months of special training which included communication skills, shop experience, physical education, and homemaking. Twelve of the experimental subjects also received psychotherapy. Formal vocational training in a sheltered workshop for males and participation in the institution work program and community vocational placement for both sexes were initiated during the final year of the program.

Results: Some of the patients in the experimental group were able to be discharged from the institution or to be placed in the community on a day basis. Others in the group were able to participate in the institutional work program. Communication, intellectual functioning, and social/personal adjustment improved significantly during the training program, but academic achievement as measured by standardized tests did not improve.

The psychotherapy program, although considered a valuable part of the program, could not be shown statistically to be effective; in fact, the subjects who received the same training except for the psychotherapy showed a more marked improvement in intellectual function and performance than the treatment group. Deaf retarded patients were shown to be successful participants in a sheltered workshop.

The importance of staff members with competence in working with deaf persons and the necessity of altering the procedures for administration and interpretation of formal tests with deaf retarded subjects were emphasized.

Comment: This is a significant study in an area heretofore largely ignored. The return of some of the subjects to the community and a significant increase in social and economic functioning of the others are encouraging when the full extent of the double handicap is considered. Furthur research and demonstration projects in this area seem to be much needed.

Altshuler, K. Z., and Sarlin, M. B. Deafness and Schizophrenia: A Family Study. In J. D. Rainer, K. Z. Altshuler and F. J. Kallmann (Editors), *Family and Mental Health Problems in a Deaf Population.* New York: Columbia University, Department of Medical Genetics, 1963. Pp. 204-213.

Purpose: To determine if there is significant correlation between early total deafness and schizophrenia, to determine the frequency of schizophrenia in the parents and siblings of deaf patients, and to ascertain the likelihood that deafness and schizophrenia would occur together more or less often than would be expected by chance.

Subjects: The subjects included 138 persons in New York State who were deaf and had also been diagnosed as schizophrenic by a committee of three clinical psychiatrists who were experienced with the deaf. Stringent diagnostic criteria were established for both deafness and schizophrenia.

Procedure: The persons studied were deaf psychiatric patients. The information regarding family members was gained through interviews with members of the subjects' families. No relative, regardless of history, was classified as schizophrenic unless there were extensive personal interviews or adequate hospital records to substantiate the diagnosis. No deaf persons were given any mental status classification unless they had a personal psychiatric interview.

Results: The deaf of New York State show a somewhat increased rate of schizophrenia over the general population. This rate is based on a sample of hospital cases and extrapolated for those in the general population. It is subject to a certain error because of the prolonged length of stay of deaf patients in mental hospitals.

The siblings of deaf schizophrenics show a significantly higher schizophrenic rate than the general population, but are similar to the rate for the siblings of hearing schizophrenics. The rates are not significantly different whether the siblings were deaf or hearing. Similar findings were obtained for the parents.

Comment: This study suggests that early total deafness imposes stressful and disruptive influences on childhood development and later life. Disturbed and distorted communication, developmental imbalances, and marked disorder of parent child relationships appear to contribute to this stress. However, the investigators felt that the stresses associated with early deafness do little to increase the chance of developing clinical symptoms of schizophrenia.

In Review

Within the educational area, considerable attention has been given to curriculum development, utilization of modern instructional media, and better definition of instructional goals. Indicative of this trend have been the great number of curriculum workshops, increased production of captioned films and other visual media for the deaf, and the reports of national conferences on the education of the deaf. In some respects, these activities have provided the most valuable contributions to the literature of the last few years regarding the education of the deaf.

Though problems of written language, preschool programs, institutionalization, family life education, and the multiply handicapped deaf have received some systematic attention, the sparcity of research in instructional methods and training of personnel in the areas of reading and the natural and social sciences is noteworthy. When these problems have been investigated, it has been within a psychological, rather than educational, framework.

The challenge for the future lies not only in evaluation of existing instructional systems, but also in innovation, testing, and refinement of unique instructional procedures keyed to the demands of modern society.

OCCUPATIONAL ASSESSMENT

Perhaps the primary goal of the deaf person who is striving to become a contributing member of society is economic independence. It has been achieved by most deaf people in recent times, but rising industrial demands for highly skilled workers and steadily declining demands for less skilled individuals may present a threat to this situation.

Shifts in industrial need have become a direct concern to educators who are planning instructional programs for the deaf. In addition to changes intended to meet this problem within existing schools for the deaf, new combinations of instructional programs are rapidly being devised. The new National Technical Institute for the Deaf and the regional technical vocational centers for the deaf are probably the most significant outcome of this interest. The research in this area is largely descriptive, although the instructional implications are fairly direct.

Lunde, A. S., and Bigman, S. K. *Occupational Conditions Among the Deaf.* A report on a national survey conducted by Gallaudet College and the National Association of the Deaf. Washington: Gallaudet College, 1959.

Purpose: To provide information concerning the occupational status and experiences of the deaf and to stimulate additional similar research that is more specific and more intensive in nature.

Subjects: A total of 10,101 deaf adults in 48 states and the District of Columbia.

Procedure: A schedule of information items was administered by deaf volunteers within local communities. Administration varied from individual interviews to mass distribution of schedules at meetings of deaf groups; in some instances, respondents filled in the schedule; in others, the volunteer interviewer did.

Results: The results of this survey are organized into general areas: (a) formal schooling and level of achievement, (b) specific vocational training received, (c) vocational training used, (d) special training for current job, and (e) help in finding the present job. The results by areas are summarized as follows:

1. *Formal Schooling and Level of Achievement.* Professional and technical occupations included a higher proportion of respondents with college education while laborers and farmers had the lowest educational achievement. A similar relationship was observed between education and income. Even at the highest income bracket ($6,000 and over) only about 20 percent of each sex reported had as much as one year of college.
2. *Vocational Training.* Only about 10 percent of each sex reported receiving no vocational training for a specific occupation. Of the large majority receiving special training, about 5 percent of the men reported studying professional or clerical subjects. The rest studied manual trades such as printing (40 percent), carpentry (20 percent), shoemaking (15 percent), woodworking (10 percent), cabinetmaking (10 percent), and baking (10 percent). Women had been taught clerical subjects (15 percent) and manual skills such as sewing (50 percent), cooking (33 percent), and domestic science (33 percent).
3. *Vocational Training.* Most of those studying a trade in school said that they had never followed it. The proportion of men never following a trade which had been taught them ranged from over 60 percent on a first trade named to 75 percent on second and third types of work studied. Among women, the percentages were over 80 percent in all cases. Over 50 percent of those males taught printing did not follow it as a trade.
4. *Special Training for Current Job.* Over 40 percent said they had no training for their present job. An additional 25 percent gave no answer (probably equivalent to "no" in this instance). Of the approximate 30 percent who answered "yes," the largest numbers

named on the job training or training received as students at state schools for the deaf.

5. *Aid in Job Placement.* Only one-third of the respondents reported receiving help in job placement from any source. About two-thirds of these respondents reported the source; about two-thirds of whom reported the source as friends or relatives. Only a small number reported vocational rehabilitation agencies or other formal sources as the placement resource used to gain employment.

Comment: This survey was the first of its kind undertaken in over 20 years. Although there is some question as to the sampling procedure, it does provide a wealth of information on the vocational status of the deaf. In addition, it has met one of its prime aims quite well—that of promoting additional research.

Furfey, P. H., and Harte, T. J. *Interaction of Deaf and Hearing in Frederick County, Maryland.* Washington, D.C.: The Catholic University of America Press, 1964.

Purpose: To study the interaction of the deaf and hearing populations in a small city and rural district.

Subjects: Eighty deaf persons residing in Frederick County, Maryland, and 1,017 hearing persons within the same geographical area were used in this study.

Procedure: The deaf population was interviewed twice, first to gather personal identifying information and second to determine the deaf person's family and individual adjustment. Other information on the deaf population was obtained from school records, court records, observations of children in school, and surveys of employers, medical personnel, ministers, and merchants of Frederick County. The hearing population was interviewed to determine its social contact with the totally deaf, knowledge of the local Maryland School for the Deaf, knowledge of the deaf and deafness in general, and personal identifying information.

Results: The essential findings may be summarized as follows:

1. The deaf are not a homogeneous group, but show the same variability as do hearing people.
2. The deaf as a group have the common problem of communication.
3. Difficulty in communication handicaps the deaf person in his family life, occupation, education, and in meeting his medical and spiritual needs. Extreme communication difficulties may impose

almost complete isolation upon the deaf individual in the hearing community.

4. Some deaf individuals are able to overcome the difficulties posed by deafness and lead useful, satisfying lives as respected members of the community.
5. Successful adjustment by the deaf does not happen by accident; it results from good individual and community planning.
6. Certain segments of the hearing population appear to be particularly aware of the problems of the deaf and can be identified by methods similar to those used in this study.

Comment: The results of this investigation, though not particularly surprising, throw considerable emphasis on the social and economic problems of the deaf person in a hearing community. Perhaps the most interesting contribution of the study lies in the effective use of a casework technique in studying the interaction between the deaf and hearing communities. A much more ambitious study using this technique is currently in progress in Baltimore, Maryland, by the same investigators.

Boatner, E. B., Stuckless, E. R., and Moores, D. F. *Occupational Status of the Young Adult Deaf of New England and the Need and Demand for a Regional Technical-Vocational Training Center*. Washington: Department of Health, Education, and Welfare, Vocational Rehabilitation Administration, 1964.

Purpose: To determine the current occupational status of, and general employment conditions for, young deaf adults in New England, and to assess the current formal vocational preparation, vocational aspirations, aptitudes, and opportunities of young deaf adults, as well as their need and demand for a regional technical-vocational training center.

Subjects: One hundred seventy-seven juniors and seniors in nine New England schools for the deaf, and 101 former students who had graduated from, or dropped out of these schools (after age 16) between 1957 and 1964.

Procedure: The students currently in school were interviewed and the General Aptitude Test Battery (GATB) was administered to 44 of them. Interviews were also conducted with the 101 graduates and dropouts and their immediate work supervisors. Questionnaires were sent to parents of all the subjects. Letters requesting academic and general information were sent to principals of regular public schools attended by one or more graduates of a school for the deaf.

Results: All groups contacted approved of the concept of a regional technical-vocational training center; the range of support was from 64 percent (parents of graduates and dropouts) to 91 percent (parents of current students). More than 50 percent of the young deaf adults declared they would attend such a center.

The vocational potential of the deaf, as assessed by the GATB, appeared quite competitive, and young deaf adults appeared significantly higher than the general population in the areas of manual dexterity and form perception, though significantly lower in verbal areas. Even though tested potential was high, unemployment was more prevalent and occupational level and wages of young deaf adults of New England were lower than that of hearing workers. Although 95 percent of deaf employees were rated as average or above average workers by their immediate supervisors, little chance of advancement was foreseen for most of them.

Comment: This is a good example of a study stimulated in part by the Lunde-Bigman report (1959). The main factors to be noted are the lack of advanced skill training and the "stationary" situation of the deaf worker. Further study into the latter aspect is indicated. A National Technical Institute for the Deaf has subsequently been established through federal legislation and is located at the Rochester Institute of Technology, Rochester, New York. Regional technical-vocational centers are currently being developed in Louisiana, Washington, and Minnesota.

Kronenberg, H. K., and Blake, G. D. *A Study of the Occupational Status of the Young Adult Deaf of the Southwest and Their Need for Specialized Vocational Rehabilitation Facilities.* Washington: Department of Health, Education, and Welfare, Vocational Rehabilitation Administration, 1966.

Purpose: To replicate, with selected revisions, the Boatner, et al. (1966) survey of the occupational status of the young adult deaf in the Southwest.

Subjects: One hundred ninety-eight students who were juniors and seniors during the 1964-1965 school year in the ten residential state schools for the deaf in seven southwestern states (New Mexico, Kansas, Missouri, Oklahoma, Arkansas, Mississippi, Louisiana), and 685 students who had graduated from, or dropped out of (after age 16), one of these schools between September 1, 1957, and June 1, 1964.

Procedure: The research design of this study was essentially identical to the Boatner, et al., study except that the GATB was administered to all 198 students.

Results: The results of this study were, for the most part, the same as those of Boatner, et al. Notable differences in the present study were that (a) a substantially lower percentage (18 percent versus 45 percent) of students received some type of training in an academic or trade program following graduation, (b) the estimated unemployment rate was higher, and (c) more staff and time were utilized to provide vocational education programs in the schools.

Comment: This study suggests that problems of the deaf related to vocational training and employment are quite similar from region to region, even though the economic bases might differ. It is also interesting to note that time spent in a vocational program is not necessarily related to a deaf individual's level of job placement. The need for improved vocational preparation and better job placement for young deaf adults is pointed out, but the exact nature of such an improved program remains as yet undetermined.

Rosenstein, J., and Lerman, A. *Vocational Status and Adjustment of Deaf Women.* New York: Lexington School for the Deaf, 1963.

Purpose: To survey the present vocational status of deaf women, to determine school and postschool factors relating to vocational success or failure, and to identify problem areas encountered during the total job process.

Subjects: One hundred seventy-seven deaf females who had completed training or left the Lexington School for the Deaf from 1935 to 1957.

Procedure: Questionnaires were sent to all the subjects and 125 were interviewed in person. Information on intelligence, school grades, scholastic achievement, and audiometric test results was obtained from school records. The subjects were rated on housing standard, communication skill, and attitudes. In addition, the parents of working subjects as well as selected employers were interviewed.

Results: There appear to be differences between deaf female workers who received academic training in school and those who received vocational training in that the academically trained workers approximate middle class expectations more closely, continue training after graduating, earn better salaries, hold more skilled jobs, and tend to receive relatively favorable vocational placement. They also appear to be more aware of societal expectations and have greater job flexibility than the vocationally trained subjects. The motivation to work and the nature of the satisfactions for deaf women generally follow the same patterns as for hearing women.

Comment: Since a number of factors determine whether a deaf person selects an academic or vocational course of study, overgeneralization from this study, which only involves one school, should be avoided. Similar studies in other schools would be helpful.

In Review

The direct relevance of the studies in occupational assessment to the instructional program requires little explanation. The need for raising instructional standards, developing specific work adjustment skills, and providing a broader social base for the educational program can be seen in these surveys.

Perhaps the greatest needs lie in the development of instruments which may serve as predictors of future vocational success for deaf students still in school, and in the development and evaluation of new instructional techniques—especially in the area of vocational education—for raising the competency level of graduates of programs for the deaf.

PSYCHOSOCIAL ASPECTS OF DEAFNESS

The areas of intelligence testing, concept formation, and social adjustment have provided focal points for research in the psychosocial aspects of deafness. The assessment of intelligence has involved primarily the use of the Wechsler Intelligence Scale for Children, the Wechsler Adult Intelligence Scale, and the Leiter International Performance Scale. A restandardization of the Nebraska Test of Learning Aptitude has also been completed. In the area of concept formation, investigators have been interested in visual retention, categorization, paired associations, and related tasks. Social adjustment of the deaf has been investigated in terms of concept attainment, self concept, personality, and adjustment within the family group.

Intelligence

Brill, R. G. The Relationship of Wechsler IQ's to Academic Achievement among Deaf Students. *Exceptional Children,* 1962, *28,* 315-321.

Purpose: To determine if the Wechsler Adult Intelligence Scale (WAIS) or the Wechsler Intelligence Scale for Children (WISC) scores can be used to predict the academic achievement of deaf students and to determine appropriate age levels for administration of the tests to deaf students.

Subjects: Four hundred ninety-nine current students or former students at the California School for the Deaf, Riverside. The subjects were classified as deaf according to the definition endorsed by the Conference of Executives of American Schools for the Deaf (1938). No hard of hearing children or deaf children with observable additional or multiple handicaps were included.

Procedure: IQ and achievement test scores were correlated. In addition, IQ distributions were analyzed for the following four groups who had completed their education at the school: (a) those going on to college, (b) recipients of an academic diploma who did not attend college, (c) recipients of a vocational diploma, and (d) recipients of a Certificate of Completion.

Results: WISC and WAIS IQ's were found to be related to the students' ultimate academic achievement. Significant differences were found in the IQ's of the four groups; means were college admissions—115.8, academic diplomas—112.5, vocational diplomas—101.7, attendance certificates—90.1, whole group—104.25. The distribution of intelligence (WISC) most nearly resembled that of the standardization population.

Comment: Despite some cautionary comments in the literature, the WAIS and WISC can serve as reasonably good predictors of academic success for deaf children.

Birch, J. R., Stuckless, E. R., and Birch, J. W. An Eleven Year Study of Predicting School Achievement in Young Deaf Children. *American Annals of the Deaf*, 1963, *108*, 236-240.

Purpose: To investigate further the predictive value of the Leiter International Performance Scale when used with young deaf children, in two areas: (a) the relationship between test scores of deaf children 4 to 8 years of age and later school achievement; and (b) the relationship between the early estimates of intelligence by supervising teachers and the predictive value of supervising teachers' judgments regarding later school success.

Subjects: Twenty-five students at the Western Pennsylvania School for the Deaf. These were the students remaining at the school who had been in a group of 35 subjects previously evaluated.

Procedure: This is a followup study of children who entered school between 1952 and 1954 when they were 4 to 8 years old. After the children had had six months of school experience, the Leiter International Performance Scale (LIPS) was administered and their supervising teachers rated them according to intelligence and achievement. The present study was intended to investigate the areas described in a previous study for the 25 children remaining at the school after approximately 10 years. Correlational analysis was performed between 11 variables which were taken from these broader classifications: LIPS score shortly after admission, rank on a LIPS classification chart, supervising teachers' estimates of intelligence and achievement in both 1955 and 1962, teachers' estimates of intelligence and achievement in both 1955 and 1962, teachers' estimates of achievement in various subject areas in 1962, and battery and selected subtest scores of the Stanford Achievement Test in 1962.

Results: The LIPS was found to have considerable value in predicting school success which held up over an 8 to 10 year period. Supervising teacher judgments of achievement and later achievement as measured by standardized test results were found to be highly correlated. The supervising teachers' judgments of the child's intelligence were also found to be strongly related to measures of intelligence and all measures of achievement.

Comment: The Leiter International Performance Scale has often been included in the clinical battery used with the deaf. This study over an 11 year period of time provides strong support for the predictive value of the instrument.

Concept Formation

Goetzinger, C. P., and Huber, T. G. A Study of Immediate and Delayed Visual Retention with Deaf and Hearing Adolescents. *American Annals of the Deaf*, 1964, *109*, 297-305.

Purpose: To compare the visual retention of deaf and hearing subjects on immediate and delayed recall and to determine if there is an order effect associated with test administration of the Benton Visual Retention Test.

Subjects: Fifteen male and 15 female students (CA's 14 to 18) at a state school for the deaf who had sustained a severe hearing loss before age three were matched on the basis of sex and age with a group of normally hearing students from a public high school.

Procedure: The Benton Visual Retention Test was administered to all subjects. There are three forms of this test, each consisting of 10 designs. Three methods of test administration have been developed: (a) 10 second exposure rate, immediate response from subject; (b) five second exposure rate, immediate response; and (c) 10 second exposure rate, 15 second delay response. Three subgroups were formed at random based on the order of presentation of the three methods so that the factor of visual retention could be studied.

Results: No difference was found between the deaf and hearing on the tests of immediate recall, while the deaf were inferior on the delayed recall test. The investigators hypothesized that the hearing were able to use subtle clues, perhaps in the form of subvocalization, to help hold the image of the design, while the deaf were not. When the tests involved essentially mirroring processes, the deaf were equal to the hearing, but were not as successful when reinforcing and secondary cues could be used. Both deaf and hearing groups performed the delayed recall test better when it was the first one administered. There were no sex differences.

Comment: The investigators suggest further research in the area of delayed memory and postulate that language acquisition is related to this factor.

Hartman, J. S., and Elliot, L. L. Performance of Deaf and Hearing Children on a Short Term Memory Task. *Psychonomic Science,* 1965, *3,* 573-574.

Purpose: To compare deaf and hearing children on a memory task which required no overt vocalization nor verbalization when the learning task was minimized. This was done in an effort to compare the auditory coding systems (which were assumed to be superior in hearing children) and any substitute system the deaf might have developed.

Subjects: Twenty-four severely hearing impaired children (twelve aged 8 to 9½ years, twelve aged 10½ to 12½ years) were matched to 24 normally hearing children on the basis of age, available IQ scores, and parental occupation.

Procedure: The children were required to give alternate responses to each of a set of colors. Two responses were available for each particular color (a maximum of four colors was used) and the number of intervening trials between repetition of the same color was independently varied from 0 to 5. Pictures of two objects whose name began with the same sound were used as responses. For example, if "book" were the response to the first yellow stimulus, then the child had to respond with "ball" when yellow next appeared. It was determined prior to testing that each child knew the name for each picture, and instructions to both groups were administered by gesture.

Results: The scores of the deaf were significantly lower than for the hearing, and older subjects performed significantly better than younger ones. Correlation between IQ and total test performance was not significant.

Comment: As the deaf subjects were not controlled for pre- or postlingual age of onset of deafness or for achievement, their lower performance could be attributed either to lack of present auditory coding or to lack of present or prior existence of a linguistic coding system. In any event, the only conclusion deducible from the information reported would be that, in this rather small group of deaf children, no substitute coding system had been (spontaneously) developed which was equal to the linguistic and/or auditory coding system available to the hearing children. The study does point out a problem area and it supports other studies on recall, but further research is necessary to verify the conclusion and to check the possibility of developing a controlled substitute system to aid in recall.

Conrad, R., and Rush, M. L. On the Nature of Short-Term Memory Encoding by the Deaf. *Journal of Speech and Hearing Disorders*, 1965, *30*, 336-343.

Purpose: To examine the type of imagery used by severely deaf children in short term memory storage of visually presented consonant sequences.

Subjects: Forty-one children attending the Ohio State School for the Deaf, ranging in CA from 13 to 20, and having hearing losses greater than 64 dB. A control group of 53 children with normal hearing was selected from a public school in Ann Arbor, Michigan.

Procedure: The subjects read five consonant sequences which were exposed for a period of 3.5 seconds. At the end of each exposure the subjects wrote down in a forced guessing situation what they could recall. Error matrices were constructed and examined statistically.

Results: Both hearing and deaf subjects made systematic errors in encoding. However, errors made by hearing subjects were acoustically similar to the correct letter, while those made by the deaf subjects were not. The hypothesis that these errors might be spatially related was not confirmed.

Comment: Although the number of subjects was fairly small and the data consisted of only 600 errors distributed in 72 cells of the matrix, this study lends support to the proposition that linguistic behavior is possible without acoustic imagery. Expansion of the study would be useful.

Furth, H. G. Visual Paired-Associates Task with Deaf and Hearing Children. *Journal of Speech and Hearing Research,* 1961, *4,* 172-177.

Purpose: To determine if the deaf child's visual memory, as measured by the perception and memory of color, differs from that of the hearing child.

Subjects: One hundred eighty children from schools for the deaf in western United States and 180 hearing children from five grade schools in one city. The deaf children all had a hearing loss sustained early in life of at least 50 dB in the speech range for the better ear. The subjects were divided into six age groups (7, 8, 9, 10, 11, and 12 years) regardless of class placement in school.

Procedure: A visual memory test was administered individually to each subject. Ten cards, each colored orange, yellow, red, and blue, were used; the backs of the orange and yellow were labeled M and the red and blue were labeled C. By nonverbal instruction, using the letters on the cards, subjects were shown how to associate two toy animals with the colors as follows: C (red and blue) for cat, M (orange and yellow) for mouse. Subjects were then shown the 40 cards in a prearranged sequence, and they responded by picking up the animal associated with the card color. After each choice the subjects were told whether or not their responses were correct. Criterion for success was 10 successive correct choices following presentation of the first four cards.

Results: No significant differences were found between the hearing and deaf subjects at ages seven through 10. However, the performance of the 11 and 12 year old hearing children was significantly superior. The author felt that this difference at the 11 and 12 year level was due to a deficiency in the experience and training of the deaf, which affected their cognitive and motivational learning attitude. For the total group no significant differences were found between the deaf and hearing subjects.

Comment: This study is one of a series of investigations by the author into thought and language processes of the deaf.

Rosenstein, J. Cognitive Abilities of Deaf Children. *Journal of Speech and Hearing Research,* 1960, *3,* 108-119.

Purpose: To determine whether deaf children differ from hearing children in the specific cognitive abilities of perceptual discrimination, multiple classification, and concept attainment and usage.

Subjects: Sixty deaf and 60 hearing children. All of the deaf children had been orally trained had sustained deafness prior to age two, had no known additional handicap, and had a mean hearing loss of 89.0 dB. Average years in school and average intelligence for all groups were very close. Two age groups (eight and 12 years) and three types of schools (public, private, and parochial) were treated in this design for both the hearing and deaf groups.

Procedure: Three nonverbal, visually presented tasks were administered to individual subjects through a device by which subjects were rewarded for correct responses. The perceptual discrimination task involved selecting from a group of eight objects the one that was different in color or form. The Wisconsin Card Sorting Task was used for multiple classification. For concept attainment and usage, subjects learned by trial and error to associate each picture in a list with one of five arbitrarily assigned numbers. In this way, the numbers became the symbolic class label to be used on successive lists of pictures. Concept attainment was measured as the decrement in errors from list to list.

Results: No significant differences were found between the deaf and the hearing subjects in their ability to perceive, abstract, or generalize. No significant differences were found when subjects were compared with respect to age or type of school attended.

Comment: Apparently, when the language tasks involved are within the capacity of deaf children, anticipated differences in language performance between the deaf and hearing are not evident.

Kates, S. L., Kates, W. W., Michael, J., and Walsh, T. H. Categorization and Related Verbalization in Deaf and Hearing Adolescents. *Journal of Educational Psychology*, 1961, *52*, 188-194.

Purpose: (a) To investigate categorization in deaf and hearing adolescents, (b) to distinguish between the processes of categorization and verbalization, and (c) to separate the effects of deafness from the cognitive effects of age and achievement level.

Subjects: Eight profoundly deaf adolescents (mean age of 18.09 and grade level score of 7.79), eight adolescents with normal hearing (mean age of 14.2 years and grade level of 7.68), and eight adolescents with normal hearing (mean age of 17.97 and average achievement for their age).

Procedure: The Goldenstein-Scheerer Object Sorting Tests were administered, and the deaf subjects were compared with the two hearing groups. The test was administered in three parts: a free sorting section, an active sorting section, and a complaint section. In the free sorting section, the subjects were asked to make up their own groups for ordering the objects. In the active sorting section, the subjects were asked to group objects according to a set of sample objects. In the complaint section, the objects were prearranged and the subjects were asked to comment on the arrangements.

Results: Deaf subjects had the same number of divisions, categories, and failures as both groups of hearing subjects. The deaf subjects categorized as adequately as the hearing subjects, but did not have as many adequate verbalizations as did the hearing group matched on age and IQ. However, the deaf subjects did seem to have the same number of verbalizations as the group matched on achievement and IQ. The deaf group had a significantly greater number of adequate categorizations accompanied by inadequate verbalizations than the control group matched on age and IQ. There were no differences, however, between the deaf group and the group matched on achievement and IQ in this area.

Comment: This study suggests that lack of verbalization in deaf students is related to language achievement levels rather than to qualitative differences in language related processes. For additional research by these investigators on cognitive processes in the deaf, the reader is referred to Kates, Kates, and Michael (1962).

Farrant, R. The Intellective Abilities of Deaf and Hearing Children Compared by Factor Analysis. *American Annals of the Deaf.* 1964, *109,* 306-325.

Purpose: To compare the performance of deaf and hard of hearing children with that of hearing children on various intellective tests and subtests and to determine whether the deaf children's abilities differ merely in degree or factorially.

Subjects: One hundred twenty deaf and hard of hearing children and 120 normally hearing children, matched for age and racial distribution, ranging in CA from 8 to 12 with a mean CA of 9.9. Ninety-nine of the deaf children attended special classes in public schools and 21 attended a residential school in the midwestern United States. The median hearing loss was 85 dB with a range of 40 to 100+ dB; thus, there were more deaf than hard of hearing subjects. No children with visual defects, medically diagnosed brain damage, or nonverbal IQ's below 75 were included in either group. The hearing group was above average in "general" intelligence, while the hearing impaired group was average.

Procedure: The following tests were administered: (a) Goodenough Draw-A-Man Test; (b) Gates Primary Paragraph Reading Test; (c) The Chicago Non-Verbal Examination; (d) The Institute for Personality and Ability Testing (IPAT) Culture Free (or Fair) Intelligence Test, Scale 2, Form A; (e) The Colored Progressive Matrices, 1956; and (f) SRA Primary Mental Abilities, Elementary Version for Ages 7-11. All children were tested in class groups, utilizing pantomime and demonstration for directions.

Results: The hearing impaired group was found to be retarded on tests involving the factor of verbal comprehension either directly or indirectly, and on most tests involving abstract figural reasoning. The abilities of the hearing impaired were not so well integrated as the hearing, and some of the tests factored quite differently for the two groups. The investigator concluded that deafness hampers the integration of mental abilities and distorts some of them.

Comment: This study supports one of the traditional views of the effect of verbal comprehension on the integration of mental abilities. The particular contribution of this investigation lies in the number and types of test instruments employed and in the factor analytic approach used to handle data.

Social Adjustment

Michael, J., and Kates, S. L. Concept Attainment on Social Materials by Deaf and Hearing Adolescents. *Journal of Educational Psychology,* 1965, *56,* 81-86.

Purpose: To study concept attainment of deaf and hearing subjects on social-thematic materials.

Subjects: Ten deaf boys and 10 deaf girls who were students at the Clarke School, Northampton, Massachusetts, matched with 20 hearing students from the Southbridge, Massachusetts school system according to sex, IQ, and age. Another 20 hearing students were matched to the deaf group according to sex, IQ, and school achievement.

Procedure: Thirty-two (of 64) cards described by Bruner, Goodnow, and Austin (1956) were used to test the subjects' ability to attain six concepts: males (man and boy), both people in night clothes, smiling females, both people in day clothes, frowning boy, and woman and boy. A focus card which contained the correct attribute was presented and the subject drew cards individually from the 32 available. The examiner then told the subject whether or not the drawn card contained the concept. After any draw the subject could offer one guess about the concept if he so wished. When a guess was correct the problem was considered solved.

Results: There were no differences between the deaf and hearing subjects except for the greater number of guesses volunteered by the hearing subjects. The deaf students showed no less of a categorical attitude with social materials than did the hearing students.

Comment: This research is in agreement with a study dealing with the concept attainment of the deaf on nonsocial materials (Kates, Yudin, and Tiffany, 1962). It is at variance with other findings and with the commonly held view that the deaf are generally retarded in the ability to attain social concepts. The research design, permitting two control groups, one for age and one for school achievement, is particularly noteworthy in this study.

Craig, H. B. A Sociometric Investigation of the Self Concept of the Deaf Child. *American Annals of the Deaf,* 1965, *110,* 456-478.

Purpose: To determine whether the deaf child's self concept is different from that of the hearing child. Four areas of sociometric perception were investigated: (a) degree of accuracy in perception of other's ratings of self, (b) direction of errors in perception, (c) general self acceptance, and (d) tendency to accept others. The effect of institutionalization upon the development of self concept was also studied.

Subjects: Sixteen children from a residential school for the deaf (institutional deaf), 16 from a day school for the deaf (noninstitutional deaf), and 16 hearing children from a public school. The three groups were matched on sex, age, class, and intelligence, and, for the two groups of deaf students, on the basis of hearing loss. Although socioeconomic status could not be controlled, the occupations of the parents were similar.

Procedure: The author's adaptation of a perceptual sociometric test similar to that used by Schiff (1960) was used. Two situations were selected as a frame of reference: a choice for recreational or informal association (a beach companion) and choice in a formal setting (classroom seating arrangement). Two sets of responses were obtained, one to determine ratings of others, and the second to determine perceptions of others' ratings of self.

Results: Both groups of deaf children were significantly less accurate than the hearing group in predicting how others would rate them. The members of the deaf institutional group were more self accepting than members of either noninstitutional group. The members of the deaf noninstitutional group rated their group mates significantly lower than either of the other two groups, while the institutional deaf children were the most socially expansive.

Comment: The author interpreted the results of the study as indicating that the deaf child's language deficit hampers the accuracy of his self concepts. The effect of institutional living is felt to predispose that group to a higher acceptance of self and of others in the "in group" of the school. Suggestions for educational changes, both curricular and extracurricular, which might make the deaf child's self concept more accurate, are included in the report.

Although the study does provide a basis for more comprehensive investigation in this area, it should be noted that limitations—especially of sample size and of the aspects of measured self concept—reduce the generalizability of the present findings.

Goetzinger, C., Oritz, J., Bellerose, B. and Buchan, L. A Study of the S. O. Rorschach with Deaf and Hearing Adolescents. *American Annals of the Deaf*, 1966, *111*, 510-522.

Purpose: To compare the responses of deaf and hearing adolescents on the Structured Objective Rorschach Test.

Subjects: Twenty-four prelingually deaf adolescents and an equal number of hearing adolescents.

Procedure: The SORT was administered individually to all 48 subjects. This test is designed to facilitate the analysis of temperament and personality. It differs from the traditional Rorschach in that (a) the stimulus-responses are provided for the subject, (b) there are a set number of stimulus-responses as a consequence of the forced choice format, (c) no inquiry of the subject is proposed, and (d) SORT is not designed for clinical use. The deaf subjects were also given the Full Scale WAIS, the Terman Non-Language Multi-Mental Test, and the Intermediate California Personality Test.

Results: The deaf were inferior to the hearing subjects in Theoretical Function and Inductive Reasoning but exceeded the hearing in Practical Functioning. The groups differed significantly in Deductive Reasoning, primarily because of above average scores for the female deaf. A sex difference was found in Rigidity, indicating an uncritical acceptance of the views of others by females, which the authors viewed as a reflection of a small town community phenomenon. No differences were found in Interest Range and Human Relationships. On the popularity attribute, the deaf subjects' responses were unusual enough to hypothesize that they see things differently from the hearing. Analysis of the Temperament Attributes showed a sex difference in persistence with both deaf and hearing females below average. A small town community phenomenon is again suspected. The deaf manifested higher aggression, less cooperation, above average tendencies in consistency of behavior, a higher degree of nonconformity, and less than average anxiety.

Comment: Assessment of personality factors of the deaf has proved to be an extremely illusive and difficult task. This study indicates one promising approach to this problem area.

Brill, R. G. A Study in Adjustment of Three Groups of Deaf Children. *Exceptional Children*, 1960, *26*, 464-466, 470.

Purpose: To compare the adjustment of deaf children with deaf parents,with deaf children who have hearing parents but deaf siblings, and with deaf children who are the only deaf family member.

Subjects: One hundred thirty-five students at the California School for the Deaf, Riverside; 45 (30 boys, 15 girls) students with deaf parents; 45 with hearing parents and deaf siblings; and 45 with neither deaf parents nor deaf siblings. The groups were matched on sex, age, and intelligence. No one was included in the third group if any relatives were deaf or if there was a history of rubella.

Procedure: A five point rating scale was constructed and completed for each child by his supervising teacher, classroom teacher, dormitory counselor, and supervising counselor, none of whom were aware of the research design. The rating scale included the following response categories: (a) very well liked by nearly all others and a good leader; (b) well liked by others his own age, reliable, and seems to have few problems; (c) seems quite normal in adjustment, problems are superficial; (d) has some problems of adjustment and has some difficulty getting along; and (e) seems to have serious emotional and social problems.

Results: No significant differences were found in the ratings given to the three groups; this held even when only teacher or only counselor ratings were used. Boys with deaf parents had more extreme ratings while ratings for boys with deaf siblings were skewed toward the low end of the scale with few extreme ratings.

Comment: Although the author had originally hypothesized that deaf children with deaf parents would be better adjusted than the other two groups because they would be able to learn a form of communication, and that deaf children with deaf siblings would be better adjusted than the group with only one deaf child per family because the family could accept the deafness to a greater degree, this prediction was not borne out.

In Review

Of the four major organizational sections, the research in the psychosocial aspects of deafness has shown the most consistent development. Though the same reservations still apply to using nonverbal tests to predict academic achievement, recent investigations offer greater insights into this problem. The area of concept formation has undergone systematic and continuous examination by a number of investigators.

One of the more interesting current trends has developed in the area of social adjustment. Since this is one area frequently presented as a problem in both the educational and vocational literature, the possibilities for behavior modifications are especially appealing.

COMMUNICATION MODALITIES

Research efforts in the communication modality area have taken a great variety of directions. Speech instruction has been closely associated with speech evaluation, much of this evaluation requiring elaborate and sophisticated instrumentation. Two approaches to manual communication have examined this mode as a possible natural language system for deaf children. The receptive communication mode of lipreading has been viewed as it relates to concept attainment and as this skill might be developed through a modern visual media technique. Considerable attention has also been given to the use and comparative value of various kinds of amplification equipment designed to maximize the auditory input of information.

Speech

Kopp, G. A., and Kopp, H. G. *An Investigation to Evaluate the Usefulness of the Visible Speech Cathode Ray Tube Translater as a Supplement to the Oral Method of Teaching Speech to Deaf and Severely Deafened Children.* Research Report. Washington: Department of Health, Education, and Welfare, Vocational Rehabilitation Administration, 1963.

Purpose: This study proposed (a) to develop methods and materials for using the cathode ray translator as a supplement to the oral approach to teaching speech; (b) to train teachers to use this system; (c) to demonstrate and evaluate the system in terms of articulation, intelligibility, and duration of words and phrases spoken by the deaf; and (d) to compare the speech of deaf and hearing children through spectrographic and graphic level analysis of word and phrase duration, formant frequencies and amplitudes of vowels, and measures of intelligibility.

Subjects: Groups of deaf students ranging in CA from 11 to 15 and with hearing losses ranging from an average of 51 to 90 dB for 125, 250, 500, 1,000, and 2,000 cycles per second, were subjects for various aspects of the study. The groups were matched on intelligence, articulation skill, and hearing loss. A group of 18 hearing students also participated in one phase of the study.

Procedure: This program of research was conducted over a three year period and was composed of a pilot study, three training projects, and two research studies. The pilot study focused on training personnel, preparing and evaluating materials, and testing the recording equipment. The three training projects concerned the instructional areas of speech intelligibility, articulation, and word and phrase duration. The research studies compared word and phrase duration, formant frequency, and amplitude and intelligibility of 10 English vowels as spoken by 18 normal hearing and 18 deaf subjects.

Results: The results indicated that the cathode ray translater is an effective aid in teaching speech; measurable changes were found favoring an experimental group (using the translator) in speech intelligibility, articulation scores, and word and phrase duration. No significant differences were found between the hearing and deaf subjects in word duration. On the basis of the second study, comparing amplitudes of formant regions one and two of deaf and hearing pupils, it was suggested that the deaf student needs to gain more appropriate use of breath stream and more accurate coupling of resonating cavities for vowel production.

Comment: Though limited in population size and complicated by the need for fairly expensive and sophisticated equipment, this study suggests both a new technique for more effective speech instruction and a new approach to evaluating speech errors in the school setting. An additional component of this study, the Kopp Sentence Articulation Test, warrants attention.

John, J. E. J., and Hawarth, J. The Effect of Time Distortions on the Intelligibility of Deaf Children's Speech. *Language and Speech,* 1965, *8,* 127-134.

Purpose: To examine the effect of altering only the time aspects of speech on the intelligibility of the spoken language of a group of deaf children.

Subjects: Twenty-nine children ranging in CA from 6 to 14 attending three different schools in northern England. All the subjects were profoundly deaf, with onset occurring before language acquisition.

Procedure: An individualized speech instruction program was conducted in which the sole emphasis was on the timing and rhythm aspects of speech. The teaching sessions were taped (tape A). As stimuli for speech production the children were asked to comment about a toy or a picture within the interest range of the age group. After the initial teaching session, the first attempts at a sentence or phrase (which was selected for practice by the teacher) by each subject was dubbed onto a second tape (B), and the last versions of the same sentence or phrase was dubbed onto a third tape (C). The order of sentences on tape C was scrambled. Both tapes B and C were evaluated by 20 untrained judges who were asked to record the sentences as they heard them. The number of words correctly recognized by the judges on each tape were compared.

Results: The total number of words spoken by the children was 148. The mean number of correctly recognized words increased from 21.6 for the initial sentences to 44.65 for the final versions of speech —a 56 percent increase. The investigators conclude that the improvement in intelligibility was achieved as a result of instruction which stressed the temporal characteristics of speech—its continuity and rhythmic patterns.

Comment: Though any instructional method placed in this limited research context leaves a number of variables—such as increased motivation and general speech improvement resulting from side effects—as possible contributors to improved speech intelligibility, the extent of change indicated in this study should have meaning to those interested in developing functional speech in deaf children.

Mangan, K. R. Speech Improvement through Articulation Testing. *American Annals of the Deaf,* 1961, *106,* 391-396.

Purpose: To obtain a measure of intelligibility of deaf children's speech, and to indicate which speech sounds are most frequently misunderstood.

Subjects: Thirty students from grades 2, 4, 5, and 7 in a school for the deaf; all of the students had hearing losses greater than 65 dB for the better ear in the speech range.

Procedure: Each subject read a list of 50 phonetically balanced (PB) words from one of several scrambled lists. A group of judges, including four teachers of the deaf, five mothers of deaf children, and four college seniors, wrote each word they understood.

Results: The judges had the most difficulty understanding surdsonant and front vowels when produced from the word lists.

Comment: Though some procedural problems—such as the selection of test materials and controls for progressive change in the judges' skill in understanding the speech samples—limit the impact of this study, the research direction has particular significance for speech instructional programs in schools for the deaf by emphasizing speech evaluation as a component of instructional modifications. It should be noted, however, that the presentation of words in isolation is at best an artificial procedure, and if speech evaluation is to assist in speech instruction, the evaluation of connected speech would seem more realistic and relevant.

Manual Communication

Birch, J. W., and Stuckless, E. R. The Relationship between Early Manual Communication and the Later Achievement of the Deaf. *American Annals of the Deaf,* 1966, *111,* 444-452, 499-504.

Purpose: To determine the effect of early manual communication on later acquisition of intelligible speech, ability to read, speechreading, written language, and psychosocial adjustment.

Subjects: Thirty-eight pairs of deaf children matched on CA, MA, sex, and age of school admission. One group consisted of children of deaf parents who had been exposed to manual communication at or before the age of two. The other, a control group, were children of hearing parents who had no early experience with manual modes of communication.

Procedure: The two groups of subjects were compared on tests of speech intelligibility, lipreading skill, reading level, written language ability, and psychosocial adjustment.

Results: The subjects who had been exposed to manual modes of communication from infancy were significantly superior in lipreading, reading, and written language. There was a tendency toward higher psychosocial adjustment scores for the early communication group, but this was not significant. There was no difference between the two groups in speech intelligibility.

Comment: The authors point out that the early acquisition of a communication system gives the child an introduction into a linguistic framework which acts as a foundation upon which to build additional skills. In this case, the early acquisition of a manual communication system provided this foundation.

At least two questions might be raised concerning this research. These questions stem from the study's implications for changes in the preschool and in early instructional treatment of deaf children.

The first question involves the number of variables which may have produced these observed differences. For example, the study of multiply handicapped deaf children by Vernon (1966) indicated significant differences in measures of achievement favoring genetically deaf over adventitiously deaf children. Since the design of the present study also tends to place genetically and adventitiously deaf children in separate groups, it is difficult to estimate whether the genetic background or the language system produced the reported difference.

The second question goes beyond this study in some respects, though it was presented by the authors. That is, the authors focus on early communication ability as the key to additional development of language skills, but a question of the appropriateness and of the relative superiority of different communication modes must be raised. Could the simplicity of the manual mode itself have inherent advantages regardless of the age factor? Or, accepting the importance of early language stimulation, might an alternate system be even more effective?

The preceding considerations prevent easy generalization from this study, but the basic issues presented by the investigators should serve to stimulate additional systematic research in this communication area.

A second study in this area completed by Kathryn P. Meadow (1968) supports the findings of this study.

Tervoort, B. T. Esoteric Symbolism in Communication Behavior of Young Deaf Children. *American Annals of the Deaf,* 1961, *100,* 436-480.

Purpose: To investigate, from a linguistic point of view, the growth of symbolic capacity in deaf children's private communication systems.

Subjects: Twenty-four American and 24 Dutch speaking children, all prelingually severely deaf, of normal intelligence and average socioeconomic background.

Procedure: Filmed, private conversations between selected pairs of deaf subjects were collected. Each filmed unit of each pair lasted 10 minutes. The film was then decoded and analyzed by the experimenter. The report presents an analysis of the films, which seems to support certain theoretical positions on the development of esoteric symbolism in the communication activity of young deaf children.

Results: Analysis of the films suggests that there is a definite development in the communication system of young deaf children. In the first stage, the natural symbol (one representing the form of a concrete object) is known only by association with the object. With use, the natural gesture develops into a formal sign. This occurs when the gesture is no longer merely associated with the object but is identified with the subject. Once the sign is repeatedly used independently of the object it becomes a fully arbitrary symbol. The author states that the formal sign is the final stage of this genetic development. Formality means "complete freedom of motivation by the object in the subject's usage." Formality in signs is a necessity for "multidimensioned use" especially in abstract and metaphoric usage. This development seems to be present in the esoteric communication system used by the subjects.

Comment: This study is based on only half the data which is to be collected over a six year period and as a result is not conclusive. Also, many of the statements in the report are based on theoretical assumptions which as yet are not statistically verified. However, the study does lend tentative support to the position that the sign language is a true language, guided by the same genetic factors that operate in a verbal language system.

The final report has been submitted and is listed under project number RD-467-64-65, Vocational Rehabilitation Administration, Department of Health, Education, and Welfare, Washington, D.C. The reader should also note the work of W. C. Stokoe, D. C. Casterline, and C. G. Croneberg (1965) who have developed a dictionary of American sign language on linguistic principles.

Lipreading

Stepp, R. E. Demonstration of a Learning Laboratory Established to Facilitate Lipreading Practice. *American Annals of the Deaf*, 1965, *110*, 588-590.

Purpose: To determine the feasibility of using a sound film cartridge for lipreading practice by hearing impaired children with a minimum of teacher participation.

Subjects: Ten children (CA range 5 to 9) with hearing losses ranging from hard of hearing to profoundly deaf. All were attending a special program for hearing impaired children, Prescott School, Lincoln, Nebraska.

Procedure: Three study carrels, each containing a sound projector and earphones, as well as an observation booth, were placed in the classroom. When the teacher assigned a lesson, the child would select the appropriate film (a cartridge containing a loop film), load the projector, start the film, and adjust the volume. The same film could be viewed as many times as necessary, since the continuous loop did not need rewinding.

Twenty-five instructional films were produced, which were designed to stress either single words, groups of words, or concepts associated with words. Each film set included a presentation, review, and response component. Responses involved either pointing to a toy or writing on a multiple choice form. Subjects were observed through one way mirrors and their responses to the materials were filmed. The responses were plotted on a time grid, and daily case histories were collected by the observer. The filmed responses were studied on a split frame basis, which showed both the child and the filmed instructor in each frame.

Results: The data were interpreted as supporting the position that deaf and hard of hearing children can assume a degree of responsibility for their own instruction in a self operated learning laboratory environment.

Comment: Problems in sampling procedures and research design place limitations on this study, but the operational aspects of classroom management appear well defined. The preliminary findings do suggest that this technique may hold considerable promise.

Tiffany, R., Kates, S. L. Concept Attainment and Lipreading Ability among Deaf Adolescents. *Journal of Speech and Hearing Disorders*, 1962, *27*, 265-274.

Purpose: To determine if good and poor lipreaders are significantly different in concept attainment capacities and processes, and to evaluate the effects of variation in difficulty of stimulus material upon efficiency and methods of concept attainment.

Subjects: Twenty-four deaf students, from 14 to 18 years of age, were divided into a good lipreading group and a poor lipreading group as determined by two tests of lipreading. The subjects were matched for degree of hearing loss, intelligence, length of school attendance, socioeconomic background, and age.

Procedure: The subjects were required to solve conceptualization problems in a card sorting task. By analyzing the card sorting tasks, concept attainment could be indicated by differences in card choices, time, redundant choices, and guesses about the correct concept before arriving at the solution.

Results: The results indicated that the poor lipreaders required more card choices, more time, and tended to make more redundant card choices before attaining the correct concepts. No significant differences were revealed in the number of guesses about the correct concepts. It was suggested that the members of the good lipreading group were better able to infer total meaning from fragments of stimuli than were the poor lipreaders.

Comment: The report isolates one factor related to lipreading ability. The implications of this study for identification of good lipreaders or for instructional changes are not completely clear and probably warrant more intensive research.

Pickett, J. M. Tactual Communication of Speech Sounds to the Deaf: Comparison with Lipreading. *Journal of Speech and Hearing Disorders*, 1963, *28*, 315-330.

Purpose: To compare the use of the tactual vocoder with lipreading in the discrimination of speech sounds, and to compare identification of words by lipreading combined with the tactual vocoder with lipreading alone.

Subjects: Two classes of profoundly deaf children from the State School for the Deaf, Stockholm, were used. One class consisted of two girls and six boys, ages 13 to 15; the second class consisted of two girls and six boys, ages 12 to 13.

Procedure: Subjects were given brief training trials in the use of the vocoder before each test. The test utterances were selected Swedish words listed in random order, and presented by the graduate student teachers, one male and the other female. The words were received simultaneously by two subjects (one by lipreading, and the other by means of the vocoder) who indicated the utterance they had heard. After one test the subjects exchanged position, and the procedure was repeated. Tests were also given to determine the combined effects of tactual and lipreading reception. Correct response percentages were recorded.

Results: Some features of speech were received better tactually than by means of lipreading, while others were received equally well with either method. The vowels /i/ and /e/ were discriminated better tactually, while with lipreading the vowels /a/ and /y/ were received better. In tests combining lipreading and tactual reception, the tactual information on consonants and syllables improved speech recognition.

Comment: The limited sample restricts any conclusions that might be made on the basis of the study, but necessity for further research is indicated.

Amplication

Shore, I., Bilger, R. C., and Hirsh, I. Hearing Aid Evaluation: Reliability of Repeated Measurements. *Journal of Speech and Hearing Disorders,* 1960, *25,* 152-167.

Purpose: To determine the differences in speech discrimination ability of hearing impaired subjects when hearing aids, tone settings, and time periods are systematically varied.

Subjects: Fifteen hearing impaired adults were seen in the hearing clinic at the Central Institute for the Deaf, St. Louis, Missouri. Five of the subjects were in each of three diagnostic groups: conductive, mixed, and sensory neural hearing losses.

Procedure: The subjects were given a battery of auditory tests to determine the degree and type of hearing loss. Four different hearing aids and two tone settings on each aid were evaluated with each subject. Measurements of the aided speech reception threshold, the aided discrimination score for speech in quiet, and the aided discrimination score for speech in noise were taken. Each of the hearing aids was evaluated in this manner on four different days.

Results: Differences in results attributable to the various kinds of hearing aids occurred most often for gain in speech reception threshold, less often for discrimination in quiet, and not at all for discrimination in noise. Hearing aid selection would, therefore, be more properly a matter of personal preference than a product of customary hearing aid evaluation procedures.

Comment: These results strongly suggest that little difference in measureable auditory improvement can be determined among the hearing aids produced by major manufacturers. Subjective judgment by the hearing aid user would appear to be a better criterion for hearing aid selection than customary clinical evaluations. Other factors such as warranties, service facilities, and cost might more properly be the major concern of individuals or schools for the deaf purchasing individual hearing aids.

Jerger, J., Carhart, R., and Dirks, D. Binaural Hearing Aids and Speech Intelligibility. *Journal of Speech and Hearing Research,* 1961, *4,* 137-148.

Purpose: To determine if binaural hearing aids are more effective than monaural aids in improving the users' ability to understand speech in difficult listening situations, specifically in the presence of competing speech or noise, and in noisy environments when the speech source is not stable.

Subjects: Forty-eight subjects with bilateral sensorineural hearing loss were divided into two groups based on CA. Twenty-four subjects were younger than 51 and the rest were over 59.

Procedure: Two indices of speech intelligibility were administered: (a) Northwestern University Test Number 2, which has a primary signal of 50 PB words and a secondary (interfering) signal of a complete sentence, and (b) Northwestern University Test Number 3 in which the primary signal is a complete sentence in the form of a question or command to which a response is given on multiple choice items; the secondary signal is continuous discourse. The tests were administered under three conditions of amplification: binaural, monaural-head, and monaural-body.

Results: There was no appreciable advantage for two hearing aids over one. On test 2 there was about a 10 percent improvement in PB discrimination using the binaural aid, but on test 3 there was no significant improvement in sentence intelligibility. The discrepancy may be related to a gross localization factor.

Comment: This study fails to support a general notion that two hearing aids are better than one in difficult listening situations. Though other gains, such as improved localization ability, may be possible using binaural aids, the major advantage to the hearing handicapped would have been in the area investigated.

Boyd, J., and Jamroz, A. A Comparison of Group Hearing Aid Systems. *American Annals of the Deaf,* 1963, *108,* 245-250.

Purpose: To compare the efficiency of three group hearing aid systems.

Subjects: Twenty-four deaf students ranging in CA from 14-3 to 18-6, with the better binaural average (BBA) for hearing losses ranging from 75 to 89 dB.

Procedure: The three group hearing aid systems were: (a) a monaural, single attenuator binaural system (SABS) which directs sound to both ears but at a single control setting; (b) a monaural, dual attenuator system (TABS) which permits adjustment of sound going to each ear; and (c) a true binaural system, providing a separate microphone, amplifier, and attenuator for each ear.

Five lists of 10 monosyllabic words each were presented and subjects responded by pointing to a picture of the test word.

Results: No clear cut advantage of the binaural system over the other two systems was demonstrated.

Comment: Though the advantages of binaural amplification have frequently been suggested in the literature, most systematic studies have failed to support this contention. At this point, the best explanation offered suggests that deaf children with a severe hearing loss tend to rely on the better ear and are not concerned about achieving a loudness balance for each ear. Verification of this hypothesis is necessary, however.

Rushford, G., and Lowell, E. L. Use of Hearing Aids by Young Children. *Journal of Speech and Hearing Research,* 1960, *3,* 354-360.

Purpose: To survey the use and degree of satisfaction with hearing aids by young children.

Subjects: A total of 1,515 children (810 boys, 705 girls) up to 9.4 years of age with hearing losses ranging from 30 dB to greater than 90 dB. The group had been enrolled in the Correspondence Course of the John Tracy Clinic.

Procedure: A questionnaire covering the following was mailed to the subjects: hearing loss, with the agency or individual first determining hearing loss and recommending hearing aid; areas of satisfaction and dissatisfaction; and subsequent purchase of additional hearing aids.

Results: Children (of the ages studied) with the most severe loss are least likely to have an aid. Apparently, economic factors, as assessed by paternal occupation, do not determine whether or not an aid is purchased. More satisfaction was expressed when the aid had been purchased at an early age and when appropriate guidance in its use had been given. A curvilinear relationship was found between acceptance of the first hearing aid and age, being highest in the youngest age group involved in the study (under 2.5 years) and in the oldest group (8.5 to 9.4 years).

Comment: This survey lends support to the clinical impression that hearing aid acceptance is enhanced by early introduction to the aid and by systematic guidance in its use.

In Review

Recent research in the area of communication has focused on various aspects of the auditory, vocal, and manual modes. Although the introduction of small wearable hearing aids and improvements in group amplification equipment were shown to have a significant impact on the communication problems of hearing impaired individuals, more recent developments have not lived up to expections. Refinements in wearable hearing aids and binaural equipment (both individual and group) have not significantly increased the usable auditory signal received by deaf people.

Investigators in the area of speech have moved consistently in the direction of more careful speech analysis, expecially through the use of electronic equipment. Though these approaches are quite interesting, the application to speech instruction in schools for the deaf is only partially apparent.

The development of a communication system in young deaf children through manual modes has been examined systematically for the first time. Additional research, currently in progress, should add a considerable body of knowledge in this sensitive area.

SUMMARY

Research efforts in the area of the aurally handicapped have focused on reexamination of old problems through new techniques and instrumentation and on systematic exploration of traditional controversies not previously investigated. The first of these categories, the reexamination of old problems, can best be seen in the psychosocial and communication areas, while the second category is most evident in investigations in the educational and occupational areas. Of particular note, however, is the fragmentary nature of research interest with sustained efforts being exerted in a few areas while other problems are largely ignored.

Three factors will probably influence research with the aurally handicapped in the next few years. The first of these is the developing influence of one research area on another. It is quite likely, for example, that research being conducted in the psychosocial area on concept formation will directly influence the instructional area, and that insights into communication modes will in turn influence the psychosocial area.

The second influence is the growing communication between and organization of professional personnel in the area of deafness, nationally speaking. As a result, universal problems are being better defined and more adequately developed. Such sharing of insights, information, and concerns within an organized framework may serve as a springboard for more effective research activity.

Finally, the infusion of highly educated personnel into this field—both from fields of study other than deafness and from increasing numbers of these people within the field of deafness—should increase both the quantity and quality of research inquiry in the difficult problem areas of deafness. This increase in the numbers of people with research interests should, at least potentially, add new vigor to research ventures.

In conclusion, although some stimulating research has opened up new ideas and new ways of treating problems, these studies have probably raised more questions than they have resolved. It now remains to be seen if the three proposed major influences of area interaction, communication and organization, and personnel development will serve as the stimuli for meeting these questions constructively.

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5

Cerebral Dysfunction

William J. Meyer

The title of this chapter implies a broad domain of disabilities which could not be fully covered in one chapter. During the past five years, an enormous amount of work has been reported on brain injured children, and only studies relevant to this problem are included here.

In the past several years, considerable emphasis has been given to the "minimal brain damage" syndrome but, in spite of this interest, there is little agreement on what is meant by minimal brain damage. Labels vary among individual investigators and include such terms as "developmental lag," "learning disabilities," and "brain damaged-like." Frequently it is difficult to produce medical evidence of organicity although there is evidence to suggest that neonatal anoxia is significantly related to the general behavioral syndrome. Thus, we are in effect dealing with a particular behavior pattern without a clear understanding of its etiology. This pattern of behavior includes distractibility, hyperkinesis, perceptual motor dysfunction, emotional immaturity, and impulsiveness. The papers dealing with this syndrome reflect the general status of our understanding of the causes, characteristics, and treatment of the condition.

The studies covered in this chapter are organized in terms of etiology, behavioral patterns, and remediation procedures.

ETIOLOGY

Speculation concerning the etiology of minimal brain damage ranges from prenatal assault and neonatal anoxia to the belief that the present day culture does not provide children, during the preschool years, with sufficient stimulation to permit neurological development. Recognition has also been given to the possibility that emotional problems generate behavior patterns similar to those of brain damaged children. This latter position would seem to overlook the possibility that a consequence of minimal brain damage may be emotional disturbance, especially when the child finds himself under considerable pressure to conform behaviorally and academically. The studies presented in this section focus primarily on the relationship between neonatal anoxia and subsequent behavior development.

Stechler, G. A Longitudinal Follow-up of Neonatal Apnea. *Child Development*, 1964, *35*, 333-348.

Purpose: To study the effects of neonatal apnea on subsequent patterns of development. Two specific hypotheses were examined: (a) on the average, children who were apneic at birth, in contrast to those who were not, will have lower average developmental quotients; and (b) the apneic children will display greater variability of performance than the nonapneic children.

Subjects: The sample included 26 first born children. Expectant women were selected during the first trimester of pregnancy, and were highly homogeneous with respect to socioeconomic background (middle class).

Procedure: Classification into the apneic and normal groups was based on direct observations of the infants at the time of delivery. These observations were directed at evidence of crying, respiratory progress, color changes, motor activity, and muscle tone.

The babies were tested approximately 24 hours after delivery and then three to five times over the first five days. The test battery included tactile, acoustic, photic, and postural stimuli, each presented in a uniform manner. Descriptive accounts of responses were made.

During the period from six weeks to 25 months, the Gesell Development Scale was administered every six weeks until the age of one year. Beyond one year, the intertest interval was approximately nine weeks. The Stanford-Binet Form L and/or the Merrill-Palmer were administered to the children between the ages of 36 and 42 months, and were used to evaluate the predictive value of the Gesell Scale and to trace the course of development for both groups.

Results: The criteria for placing children in the apneic group was the failure to observe any evidence of oxygen intake for a period beyond three minutes after clamping of the umbilical cord. Using this criterion, nine out of the 26 deliveries, or approximately 33 percent, were placed in the apneic category. Differences in birth weight between the two groups were not significant.

Although the ratings of the normal group during the five day evaluation period were somewhat more satisfactory than those for the apneic group, the relationship was not statistically significant. Variability of behavior, as estimated from test-retest reliabilities, among the apneic children was considerably greater than for the normal children (test-retest reliability was lower for the apneic children). Gross differences in performance on the Gesell Schedule for the first 25 months indicates that the apneic group had lower mean scores than the normal group. There were, however, two age levels (40-45 weeks and 20-25 months) when the apneic group performed slightly better than the normal group. The developmental trend for the apneic group shows decided improvement between 16 and 45 weeks of age, whereas the normals evidenced a more stable pattern of performance. No relationship between status at five days of age and later developmental scores was found. The mean IQ for the apneic group was 110.8 and for the normal group was 109.1, when measured after age three.

Comment: An important aspect of this study is the use of direct observations, as opposed to reliance on medical records or uncorroborated recollections, for classifying children in the apneic or nonapneic groups. The use of a three minute criterion may be overly restrictive and it certainly does not provide a basis for estimating either the extent or locus of damage. Nevertheless, the longitudinal data clearly indicate that apnea influences developmental patterns and behavioral capabilities. The followup of these children, who are now in at least the first grade, could provide extremely important information concerning the effects of neonatal apnea on academic achievement.

Graham, Frances K., Ernhart, Claire B., Thurston, D., and Croft, Margaret. Development Three Years after Perinatal Anoxia and Other Potentially Damaging Newborn Experiences. *Psychological Monographs.* 1962, 76 (Whole No. 522).

Purpose: This study examined the effects of adverse perinatal experience on behavior at three years of age. An additional objective was the comparison at three years of age of anoxic full term infants, normal full term infants, and newborns with other complications.

Subjects: From an original carefully selected sample of 713 newborn children, 421 were chosen for followup. A total of 355 of the children selected for followup were actually tested and included *all* newborns classified as "anoxic" or "other complications" and 53 percent or 191 of the normal newborns. A detailed description of those subjects not available for followup does not indicate that any selective factors were operating. Subjects were classified into one of the three groups according to predetermined criteria which included both direct observations of the infant (delayed respiration, birth weight) and biological/medical observations (fetal heart rate). Numerous other behavior tests (i.e., a vision scale, a pain threshold test) were also used.

Procedure: The testing program for the three year olds required two to three hours and included a psychological examination and a pediatric neurological examination. The 1937 Revision of the Stanford-Binet (Form L), a Vocabulary Scale (consisting of the Picture Vocabulary and Definition tests of Forms L and M, and Word Vocabulary of Form L), and a Concepts test were used. The Concepts test permitted testing at three difficulty levels: placing geometric blocks in a formboard, a matching task, and a sorting task.

A second series of assessments was concerned with perceptual-motor abilities. These tests included a motor coordination test, a copying of forms test, and a perceptual motor battery including the following subtests: a Figure-Ground test, a Peripheral-Distraction test, a Tactual-Localization test, and a Mark-the-Cars test. (Subjects were required to place a mark on each of 10 drawings of automobiles which were distributed among drawings of 20 other objects.) Two scores were obtained on the Mark-the-Cars test—the accuracy with which only cars were marked, and a second score for the type of marking used.

Assessment of personality was obtained in two ways: psychologist's ratings of various characteristics and a personality questionnaire about the child completed by the parent. Psychologist's ratings were obtained for eight traits, four of which were deemed characteristic of brain injured children (hyperactivity, demandingness, impulsivity, and distractability) and four which were considered signs of maladjustment (infantilism, negativism, fearfulness, and compulsivity). Observer agreement on the compulsivity dimensions was too low to warrant inclusion in subsequent statistical analyses. The parent questionnaire was a 209 item card sort in which the parents determined whether the behavior described was like, unlike, or questionably like their child. There were six brain injury subscales measuring hyperactivity, aggressiveness, emotionality, demandingness, unpredictability, and temporateness. In addition, there were seven maladjustment subscales measuring inactivity, infantilism, negativism, compulsiveness, fearfulness, inward directed symptoms, and adjustment. A final scale provided a check on general factors determining test responses.

Five measures of laterality were also obtained: the mother's report; the examiner's observations of hand used during testing; and observation of kicking, of reaching, and of eye used in sighting through a funnel.

Each child in the sample received a neurological examination which included an examination of the cranial nerves, reflexes, muscle tone, gait, and postural performance. Observations were made of general reactions and speech, and measurements were taken of height, weight, and head and chest circumference.

It is important to note that the psychological examiners as well as the neurological examiner were unaware of the previous classification of the children they were testing. Thus it cannot be argued that the results of the examinations were influenced by a knowledge of the child's previous history. The authors also describe the process they used to partial out the effects of possible irrelevant variables such as age, sex, race, and socioeconomic status. Thus the results reflect, as nearly as possible, the effects of the independent variable more or less exclusive of specific environmental variables.

Results: The results of this study are described in detail and are a rich source of information concerning differences between the three categories of infants. Space limitations permit only a summary of the findings. The basic results were:

1. On all tests of cognitive functioning the anoxic subjects performed significantly poorer than the control subjects. Impairment was greatest in conceptual ability even after scores were adjusted for covariation with total Stanford-Binet IQ. Anoxic subjects showed more positive and suggestive neurological findings but personality ratings failed, in most instances, to show significant differences between groups.
2. The groups did not differ significantly in amount of variation on any of the measures.
3. There was evidence that impairment at three years of age was more pronounced with postnatal than with prenatal anoxia.
4. Differences among the groups in terms of perceptual motor functions were not statistically significant.
5. The children in the category of "other complications" evidenced some significant impairment, but the effects tended to vary with the type of complication. Prematures, for example, performed

> more poorly on the cognitive and perceptual motor measures, relative to the control group, but did not have significantly more neurological findings. There was no difference between anoxic and nonanoxic prematures, suggesting that the immature organism is more resistant to anoxia than the mature. It was suggested that the inferior performance of the prematures might be considered developmental lag rather than impairment.

> It may be concluded that perinatal events contribute their portion to the crippling of human capacity, unless the present findings can be explained by factors inherent in the individual which produced both the perinatal complications and the subsequent impairment. While the association is a real one, in the sense that it is statistically significant, the prognosis of the individual child is not alarmingly worsened if he has suffered the degree of anoxia, or other complications, represented by the majority of the children in the present study. The prognosis does become of increasing concern when the number or severity of perinatal complications increases. . . . Although there were few children who suffered major handicap, it is of some importance that those not so affected were apparently not untouched. Anoxia doesn't appear to have an all-or-none effect. Rather, in the light of these results, the concepts of minimal brain damage and of a continuum of reproductive causality appear reasonable.

Comment: With respect to the thought and care involved in this investigation, there are probably few other studies in the area which are of equal quality. Anyone interested in working in this general area should be thoroughly familiar with the issues raised in the monograph and with the research strategy involved.

One problem which was raised by the authors and is worthy of somewhat further consideration concerns sample selection for studying the effects of anoxia. As shown in this study, there are variables associated with anoxia, such as sex and socioeconomic status, which must be controlled. In an actuarial sense one would expect more children from lower socioeconomic groups to evidence signs of anoxia or other neurological complications. It is also clear, however, that socioeconomic status correlates highly with most of the behavioral measures that psychologists employ in assessing the effect of anoxia. Thus it becomes crucial that these irrelevant variables be partialed out statistically, as was done in this study. The problem cannot, however, be handled with entire satisfaction by statistical means. Lower class parents, for example, are reported as developing in their children an impulsive approach to problem solving. This environmentally produced impulsivity then could interact with neurological impairment in such a way as to suggest that the neurological impairment was in fact even greater or that the neurological impairment severely influenced behavior. What is needed here, obviously, is a series of long term studies, such as the one reported by Graham and her colleagues (1962), in which observations are made of parental reactions to their children, and where the effects of these parental reactions can be partialed out of the final analysis. This proposal suggests merely that we examine in the future the interactive effect of anoxia and variations in environmental inputs.

Corah, N. L., Anthony, E. J., Painter, P., Stern, J. A., and Thurston, D. Effects of Perinatal Anoxia after Seven Years. *Psychological Monographs,* 1965, 77 (Whole No. 596).

Purpose: To examine age differences in the behavioral patterns of children classified at infancy as normal or anoxic. The subjects are identical to those studied by Graham, et al. (1962).

Subjects: The followup sample was comprised of 101 children who were anoxic full term infants and 134 children who were normal full term infants. This sample of 235 children was 85.5 percent of the infants studied at three years of age (infants born with "other complications" were not considered for the seven year followup). Lost subjects were approximately evenly distributed among the normals and anoxics.

Procedure: Measures were obtained on cognitive and perceptual abilities (WISC, Gilmore Oral Reading Test, a perceptual motor test, the Embedded Figures Test, and a perceptual attention test); personality ratings by psychologists (anxiety, impulsivity, activity, and rigidity-lability); parent ratings (Vineland Social Maturity Scale and ratings on 18 traits); teacher ratings (these scales were similar to the parental scales); and psychiatric and neurological examinations. As in the Graham, et al. (1962) study, examiners were unaware of the child's previous diagnosis.

Results: The significant difference in IQ between the anoxic and normal children observed when they were three years old was no longer present at seven years of age. A statistically significant difference between the two groups on the perceptual motor test was apparent at the seven year level but was not present at the three year level. One difference between the groups which remained statistically significant was performance on the vocabulary subtest of the WISC, which was interpreted as a continued deficit in abstract ability. Differences between the groups on the reading test were not statistically significant. Ratings on the personality scales indicated that impulsivity and distractibility were significantly greater among the anoxic youngsters (but only for those in the postnatal anoxic group) than among normals. The results were interpreted as giving little support to the hypothesized clinical brain damage syndrome. Results of the teacher and parent ratings indicated that the Vineland Test of Social Maturity was the most discriminating measure. On this instrument the anoxics received a significantly lower average social quotient than did the normal subjects. The anoxic children obtained significantly lower scores on self help, occupation, and socialization. In general terms, the anoxics tended to be more dependent than the normal children. The results of the neurological examination indicated a slight tendency for the anoxic children to show more positive and suggestive signs of neurological deficit, but the differences were not statistically significant. The results of the psychiatric rating suggest that clinicians are capable of detecting behavioral clues considered to be indicative of neurological deficit. It should be noted, however, that the psychiatrists rated only 60.2 percent of the normals as showing no organicity.

The results of this study suggest that the age at which clinical diagnosis of brain damage is made is related to the number of symptoms that might be present. The conclusion is also warranted that perinatal anoxia is related to behavioral deficits at seven years of age but that such deficits are reasonably minimal for the group as a whole. "A prognosis for any given newborn would be very difficult to make except when there are very severe or numerous complications."

Comment: The results of this study, along with those reported by Graham and her associates, suggest that the effects of prenatal or neonatal anoxia, although detectable in the child's behavior at three and seven years of age, are not overwhelmingly devastating. These results, especially with respect to the failure to obtain differences between groups on the reading tests, may be viewed with some surprise by the reader. It should be kept in mind, however, that those studies reporting significantly greater incidents of prenatal and postnatal complications among good and poor readers are capitalizing on innumerable opportunities for other variables correlated with pre- and postnatal complications to affect reading performance.

There are at least two explanations that could account for the weak effects of anoxia reported in this study. First, it may be that moderate anoxia in newborn infants does not in fact seriously affect subsequent behavioral capabilities. Along this line it could also be argued that anoxia has variable effects on neurological systems and that averaging over subjects cancels out more serious consequences. This latter question will obviously require extensive research. A second possibility is that anoxia has fairly uniform deleterious effects, minimal though they may be, which can be accentuated by environmental variables. This possibility was suggested in the comments with regard to the Graham, et al., paper. Thus, the possibility exists that whereas certain parental behaviors would have marginal effects on a normal child, the same parental behavior might have more serious consequences for the anoxic child. Again, research employing large more or less randomly selected samples in which the interaction between anoxic children and their parents is observed, is needed.

Finally, this study raises another very important problem concerning differential diagnoses of children with respect to subsequent achievement behavior in school. Recall that there were no differences between groups on the perceptual motor tests at three years of age but that differences emerged at seven years of age. This finding suggests that the normal children continued to improve on perceptual motor tasks whereas, on the average, the anoxic children did not. Clearly, however, some of the anoxic children did, in fact, improve because their average performance at seven years was better than their average performance at three years. Knowing that a child had suffered anoxia would not, therefore, provide a basis for differential diagnosis because some of the children would show marked improvement over time. The yet unsolved problem is how to predict with greater accuracy those children who will *not* show such improvement. This problem is discussed further in the review of the standardization data of the Koppitz Perceptual Motor Tasks.

Klatskin, Ethelyn H. Relationship of Deficits in Intelligence Test Performance of Preschool Children to Perinatal Experience. *Journal of Consulting Psychology*, 1964, *28*, 228-233.

Purpose: To document "the significance for minimal brain injury of isolated deficits in intelligence test performance among children of average or better ability without known neurological or behavioral deviations, by relating these to perinatal experience in general, rather than to specific perinatal conditions."

Subjects: A total of 193 children serving as subjects at three years of age; of this group, 119 were selected at five years of age. The children were predominantly middle class and all but three were Caucasian. None of the subjects were born prematurely or by caesarian section, and there were no physical disabilities apparent at infancy. The children were classified as unstressed (Group I), suspect

(Group II), and stressed (Group III) on the basis of evaluation of obstetrical records made on intake, during the course of labor, and upon delivery, and the pediatrician's delivery room examination of the neonate.

Procedure: The Merrill-Palmer Scale was administered at three years of age and the Stanford-Binet Form L, Seguin, and Mare and Foal formboards at five years of age. The testing was done by psychologists who were not aware of the subjects' previous medical history. The children were grouped into those with IQ's between 90 and 119 (average group) and those with IQ's of 120 and above (superior group). Specific items on the various tests were then examined for differences in percentage of subjects passing each test.

Results: Significant differences in ability to copy forms were found at both intelligence levels between Group I and Groups II and III combined. This difference existed at both age levels. At the three year level, but not the five year level, a significant difference in verbal skill was found between Group I and Groups II and III combined within the average intellectual group.

Those skills involved in perceiving a complex visual stimulus and making complex visual motor responses are apparently the more sensitive indicators of presumed neonatal organic damage. The data further suggest that there is recovery of function with age but that the degree of recovery is greater among the superior subjects regardless of the degree of presumed damage and also among the presumably less damaged subjects. In more general terms it can be concluded that the effects of adverse perinatal experiences are more apparent among average than among superior children.

Comment: These results suggest that medical reports, if carefully recorded and interpreted, can provide useful evidence for subsequent neurological status. More studies are necessary, but it is possible that such data would prove helpful in conjunction with the results of psychological tests and behavioral observations in the differential diagnosis of children prior to the emergence of academic difficulties.

CONCLUSIONS

The studies reported in this section support the position that perinatal anoxia is related to general behavioral dysfunction. The detrimental effects are not, however, as overwhelming as suggested by some authors. These studies also provide general support for the conclusion that at least certain aspects of the behavioral deviation are overcome within a relatively short period of time—that is, within three to four years after birth. The major behavioral dysfunction apparently occurs in those integrative functions involving higher order verbal conceptualizations (vocabulary) as well as perceptual motor ability. Effects on visual motor ability emerge somewhat later, between ages five and seven, than vocabulary and persist until a later age. As noted in the next section of this chapter, it is quite likely that the visual motor dysfunction will be observable until approximately age nine. Verbal ability is apparently recovered more rapidly, achieving a status of equality with normal children by four or five years of age. It is significant, however, that behavioral deviations are apparent as early as three months of age and some of these deviations are maintained over five or six years.

Although the studies cited provide important clues about the effects of perinatal anoxia on behavior, it should be obvious that the data represent first approximations to achieving an understanding of the effects of "brain damage" on behavior. A gross measure of potential brain damage such as anoxia does not, for example, provide any clues about the locus of the damage. Speculations that the damage occurs in motor inhibiting areas of the brain are clearly circular and do not account for the observed variability in impulsivity among anoxic children. Further work is obviously required to determine whether anoxia has, in fact, more generalized diffuse effects or whether specific aspects of neurological development are impaired. If the neurological effects are specific, then we will need to develop more exact procedures for identifying the locus of damage so that the behavioral effects can be better understood.

It is also unfortunate that, so far, no research has been reported in which parental behaviors toward anoxic children have been investigated. Our current state of knowledge about the effects of anoxia on behavior may be too primitive to permit a completely meaningful analysis of parental behavior, but we must not let the importance of anoxia preclude the examination of other variables influencing the child's life.

The necessity for more research incorporating diverse variables is obvious. The studies in this section do provide, however, a basis for recommending that more careful medical records be provided to public school officials at the time the child first enters school. As is noted in a subsequent section of this chapter, it is presently very difficult to differentiate, using current testing procedures, minimally brain damaged children from children with normal patterns of development. This is especially true when such differential diagnosis is attempted at the five to six and a half year old level. The availability of data describing the child's status at birth may serve a very useful purpose in planning a kindergarten and primary grade curriculum for the child sufficiently early to avoid academic failure.

BEHAVIORAL PATTERNS

Only a few representative studies can be reported in this section. The interested reader should examine the excellent papers in the book *Reading Disability: Progress and Research Needs in Dyslexia,* edited by John Money (1962), and *The Teacher of Brain Injured Children,* edited by William Cruickshank (1966).

Maslow, Phyllis, Frostig, Marianne, Lefever, D. W., and Whittlesey, J. R. B. The Marianne Frostig Developmental Test of Visual Perception, 1963 Standardization. *Perceptual and Motor Skills,* 1964, *19,* 463-499.

Purpose: One generally agreed upon symptom of neurological impairment is visual perceptual dysfunction. Typically, this problem is manifested in an inability to reproduce graphically two dimensional geometric figures such as is required on the Bender-Gestalt Test. This study describes the results of a standardization of Frostig's visual perceptual test.

Subjects: Although an effort was made to stratify the sample in terms of socioeconomic status, this proved impossible for a variety of reasons. The public school sample, therefore, is comprised largely (93 percent) of middle class children with only 1.5 percent from a high socioeconomic level. The characteristics of the nursery school samples are not specified. The 2,116 children in the total standardization sample range in age from three to nine years. Norms are reported in half year age groups with the largest number of children in the six and a half to seven year group ($N = 240$) and the smallest number of children in the three to three and a half year age group ($N = 107$). No Negro children were included in the sample and there were a "few" Mexican Americans and a "few" oriental children.

Procedure: The Frostig Test measures five areas of visual perception: (a) eye-hand coordination, in which the child is asked to draw straight and curved lines between increasingly narrow boundaries or to draw a straight line to a target; (b) figure ground perception, in which the child must discriminate between intersecting shapes and find hidden figures; (c) form constancy, in which the child must discriminate circles and squares in different shadings, sizes, and positions among other shapes on the page; (d) perception of position in space (directionality), where the child must differentiate between figures in an identical position and those in a reversed or rotated position; (e) spatial relationships, in which the child copies patterns by linking dots.

All examiners were trained at the Marianne Frostig School of Educational Therapy and all tests included in the standardization sample were given and scored by persons trained at the Frostig School. The public school children were tested in their regular classrooms in minimal groups of 15 children (the maximum is not reported). A second person was always present during this testing. The kindergarten and first grade children were given a five to ten minute break after completion of the second subtest.

The nursery school children were tested in groups of two to eight children. If there were only two or three children, the examiner worked alone, but if there were four or more children, two people were present during the examination. Appropriate procedures to avoid copying on the part of the children were used.

The items within each of the five subtests had been previously graded in terms of level of difficulty. Within each subtest, the item represented an age progression in terms of level of difficulty and the items within the subtests were selected so as to minimize the degree of correlation among the subtests.

The time required for group administration of the test is less than one hour, whereas individual administration takes between 30 and 45 minutes. The scoring system, described in a manual (Frostig, Lefever, and Whittlesey, 1964) is objective and requires between five and ten minutes per protocol.

Results: Data are reported in terms of a "perceptual age level" for each of the subtests, "scale scores" which are the perceptual ages of the subjects divided by their chronological age multiplied by ten and adjusted to the nearest whole number, and "perceptual quotients" which are deviation scores "obtained from the sum of subtests scale scores after correcting for age variation." Of the three measures, the authors feel that the perceptual quotient provides a better prognostic indicator than the other two types of scores (since the remaining scores do not indicate the child's perceptual ability relative to his chronological age, but rather indicate his developmental level with respect to visual perceptual development). The authors contend that a perceptual quotient of 90 or below, among kindergarten children, is a strong indication that the child should receive special training. A table for determining a perceptual quotient for the total score (the sum of the five subtests) is also presented.

Growth curves for the individual subtests indicate that most rapid development occurs between the ages of four and seven, suggesting that the tests may be most useful for children in this age range. Beyond the age of ten, the perceptual quotient and scale scores are not recommended; rather, the children should be studied solely in terms of their subtest perceptual age equivalents. This latter recommendation is consistent with the fact that the standard deviations for subtests two through five, but not subtest one, decrease substantially with increasing age.

Sex differences in the degree of correlation among the five subtests were examined using the kindergarten sample. The intercorrelations were not significantly different, indicating that sex is not a significant subject variable contributing to the correlations among the tasks. Differences in average performance between the sexes at the kindergarten level are not reported.

Test-retest reliability, with a two week separation, was determined using 70 first grade and 74 second grade children. Two administrators were used; one was specially trained in the Frostig test and the other was familiar with the test and the administration manual but had no previous experience in administering the test. Reliability of the perceptual quotient for the entire sample of 144 children was .80. Reliabilities for the subtests ranged from .42 (subtest two) to .80 (subtest three). Reliabilities for the other subtests are not presented.

A reliability check was run on the five scales using 55 kindergarten children and 72 first grade children and employing examiners trained in giving the Frostig test. These examiners were not psychologists or psychometricians, but staff who had previously been involved as proctors. Retesting occurred 14 days after initial testing, and a different examiner was used. Reliabilities are reported for both raw scores and scale scores. Split half reliabilities are also reported and are substantially higher than the comparable test-retest coefficients. Among the split half reliabilities it is noted that there is a tendency for overall reliability to decline somewhat for the older children, which is probably attributable to the smaller standard deviations at those age levels.

The assumption that the five subtests are measuring different attributes of perceptual development was tested by computing intercorrelations among the five subtests for the kindergarten, first grade, second grade, and third grade subjects separately. These correlations are based on scale scores for which, it will be recalled, the test-retest correlations are somewhat lower. In general, the magnitude of the correlations is sufficiently small to provide support for the assumption of independence of subscales.

Correlations between the Frostig test and the Goodenough test are also reported for kindergarten, first grade, and second grade children. The correlations are .46, .32, and .37, respectively.

The relationship between Frostig test performance and the ability to learn to read was examined in a study involving 25 children between the ages of four and one-half and six and one-half years. These children were exposed to reading materials but not forced to use them. Those children who indicated interest in the reading materials were given training in word attack skills, phonics, observation of configuration, and use of contextual clues. The Frostig Test was administered to all 25 children, eight of whom obtained perceptual quotients of 90 or below. It was predicted that these eight children "would not attempt to learn to read because of their difficulties." When the children were subsequently rated for reading achievement, it was found that none of the children with perceptual quotients below 90 had begun to read, and that only one of the two children with a perceptual quotient of 90 had learned to read (this child read very well). Only one of the children with a perceptual quotient above 90 evidenced reading difficulties. Another study (Frostig, Lefever, and Whittlesey, 1961) involved a sample of 71 children with known learning difficulties, a high percentage of whom had been diagnosed as neurologically handicapped. It was observed that these children showed much greater scatter in age equivalent subtest scores than did those of normal children and the total scores were lower.

Comment: There are certain problems related to the Frostig test which require comment. Obviously there are limitations in terms of sampling. Thus, children from socioeconomic levels below those in the standardization sample are likely to perform less adequately, which may or may not have diagnostic significance. Another limitation is the rather low test-retest reliabilities. There is general agreement that a psychological test to be used for individual diagnosis must attain a reliability level of at least .85. One can only conclude that at the present time the Frostig Test should *not* be used as a basis for individual diagnosis. The high test-retest correlations for the 50 children with learning dysfunctions do not change the conclusions because (a) they represent an extreme end of the distribution, and (b) the same examiner administered the test on both occasions.

Unfortunately, neither the Frostig test nor any other test resolves the important problem of differentiating between children with organic pathology and those whose perceptual development is slow but evidences consistent improvement. This issue will be examined further after a review of the next paper.

The general approach reflected in the Frostig test appears to make good sense. Clearly, however, more research is needed to improve reliability, to determine the effects of examiner characteristics on performance and the relationship between perceptual ability and general intellectual ability, and to determine the general predictive power of the test, especially with IQ partialed out. There is also an urgent need for a more adequate standardization sample.

Koppitz, Elizabeth M. *The Bender Gestalt Test for Young Children.* Columbus, Ohio: Superintendent of Public Instruction, Ohio Department of Education, 1967.

Purpose: The Bender Gestalt (Bender, 1938), a test of visual motor perception, has been widely used with populations of adults. Its apparent suitability for use with young children prompted the development of this manual which includes the scoring system, normative data, and some validity studies.

Subjects: The normative sample includes a total of 1,106 children from kindergarten through fifth grade. The children represent 46 entire classrooms and 12 different schools. Characteristics such as socioeconomic level, intellectual ability, and sex distributions are not reported.

Procedure: Each child was tested separately following the procedures outlined by Bender (1938). The children were given a sheet of white typing paper and a #2 pencil and told: "I have 9 cards here with designs on them I want you to copy. This is the first card; now make one just like it." Average testing time was five minutes, ten seconds.

Scoring involves a binary system so that items are scored either one or zero. A score of one indicates the presence of a deviation; thus a high score indicates poor performance. Scores for each design are pooled, yielding a composite Bender score, on the basis of which the norms were developed. Detailed procedures for scoring each item are presented in the manual. Errors such as rotations, distortions, failures to integrate, and perseverations comprise the main scoring categories.

Results: Examination of the means for each six month age interval ranging from 5-0 to 10-11 reveals, as anticipated, a trend of decreasing means (improved performance) with age. Maximum variability occurs in the age group 6-0 to 6-5, with a standard deviation of 4.12. As Koppitz carefully notes, the predictive usefulness of the Bender beyond 9-0 is highly limited because of the restricted variance. It is likely, however, that negligible variance will occur at lower age levels among superior samples. For example, in a study by Meyer (1967), a correlation of .57 was obtained between the Bender (scored using the Koppitz system) and reading achievement as measured by the Metropolitan Achievement Test, Primary I. In this case the Bender had been administered to the children in June of their kindergarten year and the achievement test was administered at the end of the first grade. The correlation between the Bender administered the same week as the achievement test was —.05. The total *N* was 34 and the sample was obtained from a suburban middle class school district. The low correlation occurred because of the restricted variance found on the second administration of the Bender.

Comment: Although no data are printed in the manual concerning observer agreement, the system appears sufficiently objective that high agreement would be expected. This expectation is confirmed in a study by Egeland, Rice, and Penny (1967), who report a correlation of .90 among three independent raters. It is unfortunate that test-retest (two week) reliabilities are not reported.

Both the Bender-Gestalt and the Frostig Perceptual Test are apparently designed to screen perceptual problems among young children. The Frostig Test includes five more or less independent measures, whereas the Bender relies entirely on a single measure of perceptual motor ability. The advantage of the five test battery for predictive purposes is not yet clear. Comparisons between the Bender and the full scale Frostig, however, reveal very similar developmental trends. Thus, as reported in Koppitz' manual, and in a study by Smith and Keogh (1963), most rapid development on the Bender occurs between kindergarten and second grade. A similar result was reported by Frostig.

The reported age trends indicate most rapid development at the very time when *differential* prediction of academic success is extremely crucial (kindergarten to grade 2). In clinical terms, these developmental data mean that more accurate predictions of success in the first grade can be made than predictions of failure. This is the case because the early maturer possesses the perceptual motor abilities necessary for academic success. However, those children whose performance is poor *may* show very rapid improvement during the ensuing months (summer vacation) and possess the required perceptual motor abilities by first grade. There will be some children, however, whose performance will not improve, but neither the Bender-Gestalt nor Frostig Test can identify these children. As noted earlier in this chapter, it is important that these children be identified prior to formal academic instruction. Once identified, appropriate remedial procedures can be planned. The possibility that more detailed information concerning the child's prenatal, neonatal, and early childhood histories might serve as an aid in differential diagnosis should be considered.

Boshes, B., and Myklebust, H. R. A Neurological and Behavioral Study of Children with Learning Disorders. *Neurology*, 1964, *14*, 7-12.

Purpose: This study is concerned with the relationships between "minimal" involvements of the brain and specific deficiencies in learning. More specifically, it was expected that minimal brain dysfunction would be related to reading, arithmetic, and right-left orientation.

Subjects: Eighty-five children, ranging in age from 7 through 18 years, served as subjects. These children had been referred to a clinic because of school failure. The children had a minimal IQ score of 90 and no hearing or visual defects, emotional disturbances, or obvious cerebral palsy.

Procedure: The children were examined neurologically and by means of an electroencephalograph. Only those data from the neurological study are presented, and on this basis the subjects were classified into three groups: negative, suspect, and positive. The bases for such classification were the presence of associated movements and evidence of choreiform disturbances, asymmetries in movements, differences in adequacy of bilateral reflexes, and plantar stimulation. Classification into each of the three groups was as follows: *negative,* no deviations in any of the observations made; *suspect,* at least one unequivocal abnormal neurological finding; and *positive,* two or more readily discernible abnormal findings. Classifications were determined purely on the basis of objective symptoms; that is, clinical histories were not read nor was reference made to the EEG by the person making the classifications.

The three groups were compared on 21 behavioral characteristics including the 11 subtests of the WISC, CA, Social Maturity, Silent Reading, Oral Reading, Syllabication, Auditory Blending, and Spelling. The Gates Primary, Advanced, and Basic Reading Tests were used to measure silent reading, while oral reading was measured by the Gates Reading Diagnostic Test. The latter test was also used to evaluate syllabication, auditory blending, and spelling.

Results: Differences among the 21 behavioral characteristics between the three groups were uniformly not statistically significant. Thus there was no relationship found between the behaviors studied and neurological status. Further statistical analyses involved multiple regression techniques. These techniques made it possible to determine the extent to which "there was a consistent and significant trend for the inter-test correlations to increase from one group to another." The resulting analyses indicated

> that as the child becomes older, he is less and less able to show the expected maturation. The trend is for this lack of normal rate of growth to increase concomitantly with the extent of neurological deficits present.

The measures of social maturity, auditory blending, and spelling most frequently showed a trend relationship with neurological status.

An interesting interpretation is given to the failure to find significant differences between the groups and the success of finding significant trend effects. Briefly, the authors argue that the neurologically impaired children attain similar levels of achievement as the normals by using different psychological systems for processing stimulus input. They state

> . . . the child with positive neurological findings attains the same levels of achievement but at the price of "shifts" in his psychological structure. His perceptual awareness and the processes whereby he learns and whereby experience becomes meaningful differ from those found to be negative neurologically. On this basis, in order to assist these children most beneficially, we must be aware of the far reaching implications of minimal neurological disturbance.

Comment: The multiple regression techniques described in this study appear promising and should be further developed. There is another aspect of this study which is more crucial to planning future studies. The issues which will be briefly described here can be examined in greater detail in a paper by Cohn (1964), who is a research neurologist at the US Naval Hospital, Bethesda, Maryland. In this article, Cohn uses the Boshes and Myklebust study (1964) as well as studies by Kennard (1960) and Anderson (1963) as the focus of his discussion. Essentially, Cohn is critical of the equating of minimal neurological signs with minimal brain damage. What is considered "minimal" may vary among neurologists and there is no evidence that *minimal clinical signs* are related to *minimal brain* *pathology*. Thus it is possible to observe minimal clinical signs when, in fact, there exist gross lesions of the brain. The converse is also possible. Cohn proposes

> . . . that the neurological study should encompass the totality of the systematically recognizable receptor activities and the general subsequent responses of the child to these received stimulus patterns; any deviations from the range of normal should not be considered *minimal* [p. 180].

Birch, H., Thomas, A., and Chess, Stella. Behavioral Development in Brain-Damaged Children. *Archives of General Psychiatry*, 1964, *11*, 596-603.

Purpose: This paper describes the development of three brain damaged children from early infancy into the school years.

Subjects: The three children, two boys and a girl, were subjects in the New York longitudinal study of behavioral development, described by Thomas, Chess, Birch, Hertzig, and Korn (1963). At birth, when the children became part of the longitudinal study, there was no suspicion of brain injury. Each child was seen at intervals of three months during the first 18 months, and at six month intervals thereafter.

Procedure: Data include parental interviews, teacher interviews, direct observations both at home and at school, psychological testing, and clinical evaluations. Particular emphasis was given to the child's "temperamental organization," that is, his activity level, rhythmicity, adaptability, approach withdrawal tendencies, thresholds of responsiveness, intensity of reactions, mood, and distractibility-nondistractibility.

Results: Detailed case studies are presented for each of the three children and, in general terms, demonstrate that the consequences of brain injury are highly variable. One of the children, for example, showed only minor behavioral difficulties and his school performance was quite adequate. A second child, however, was a behavior problem, was below average intellectually, and was unable to remain in the normal school situation.

The authors feel that the observed variability among the three children precludes the notion of an invariant behavioral pattern as the result of central nervous system damage.

The behavioral sequelae of brain damage in childhood can be most diverse, and may range from no apparent behavioral disturbance, absence of behavioral disturbance but presence of mental subnormality, to serious disorganizations of social, intellectual, and interpersonal functioning which are phenomenologically indistinguishable from the major psychoses of childhood.

Comment: Clearly, selected case studies do not permit an assessment of the frequency with which a brain injury syndrome exists in the population; thus the study disproves nothing. It may be that the syndrome occurs but at a frequency level far below previous estimates. The major contribution of this paper is its call for greater care in specifying antecedents of observed behavior both at the physiologic and the environmental level. The procedure of labeling hyperkinetic or distractible children as "brain injured" ignores all other possible antecedents and thus could restrict the range of possible remedial procedures that might be seen as appropriate had such labels not been used. In view of the widespread acceptance of a "brain-injured" syndrome, the authors' cautionary remarks are both wise and timely.

CONCLUSIONS

Several conclusions can be derived from the studies included in this section and from the many other papers which could not be included. Most obviously, the available diagnostic procedures for identifying brain injury are at an early stage of development. Neurologically, for example, there are problems of determining locus of damage, particularly as this relates to behavioral effects among preschool and primary grade children. There are problems of differentiating organic pathology from the effects of normal developmental processes and/or environmental effects. And, finally, there is evidence to suggest that behavioral patterns among brain injured children are sufficiently variable so that labeling based on psychological tests and/or observations of behavior are, at best, tenuous. It seems that, once more, we are to be frustrated in our efforts to place children in neatly labeled descriptive categories to explain the behavior and dictate remedial procedures.

There exists in the literature a number of studies which, because of some peculiar logic, are also related to cerebral dysfunction. These studies employ extreme groups—that is, good versus poor readers—and compare them on measures often associated with brain injury. When differences are found—and they usually are—it is inferred that the low group is brain injured. Rarely is the effect of general intellectual ability partialed out, nor are other variables of known relationship to the diagnostic measure. Even if such controls were employed, the use of extreme groups enhances the chances that a number of unspecified variables, correlated with the diagnostic measure, are contributing to the observed effect. Such conclusions, without external validating criteria, contribute little to basic knowledge and perform the further disservice of suggesting that the diagnostic measure is effective with unselected samples of children.

A promising alternative strategy, at least from a pragmatic viewpoint, is suggested by Gallagher (1966) and his associates. Essentially the argument is (a) that we are basically interested in function and (b) that labels which infer structure only impede understanding. Stress is given to the patterns of behavioral capabilities evidenced by the child (as measured by the Illinois Test of Psycholinguistic Abilities, for example) and the development of remedial procedures relevant to the behavioral pattern. Experimentation with teaching methods, techniques of stimulus input, behavioral management, and modes of expression are necessary until an effective approach emerges for a particular child. The work of the Russian psychologist Zaphorets (1965) on the remediation of perceptual motor dysfunction, for example, holds considerable promise and should be carefully explored by child workers. Hopefully, American psychologists and educators will direct more of their efforts to experiments with remedial procedures instead of continuing down the cul de sac of developing new tests for describing old phenomena.

REMEDIATIONAL PROGRAMS FOR CHILDREN WITH CEREBRAL DYSFUNCTIONS

The education of children with cerebral dysfunctions, or learning disabilities seemingly associated with brain injury, is a major challenge to educators. Unfortunately, there are relatively few programs available that have been systematically evaluated. Delacato's (1963) program has received wide publicity but a careful evaluation of its effectiveness has yet to be reported. Kephart (1960) has proposed numerous procedures and materials which can be used in the typical classroom situation and which seem to hold considerable promise. Indeed, his book contains so many interesting ideas that might be used with all children that it can be generally recommended to teachers. To the writer's knowledge, however, there has not been any systematic evaluation of these techniques under classroom conditions.

It was decided to use the remaining portion of this chapter for an extended analysis of the study by Cruickshank, Bentzen, Ratzeburg, and Tannhauser, which was previously reviewed by Haring in 1963 in the first volume of this series. This analysis is included to provide further perspective and reflection on a complicated and ambitious effort which has had an enormous impact on thinking and practice.

Cruickshank, W. M., Bentzen, Frances A., Ratzeburg, F. H., and Tannhauser, Miriam T. *A Teaching Method for Brain Injured and Hyperactive Children.* Syracuse, New York: Syracuse University Press, 1961.

Purpose: Assuming that one of the behavioral characteristics of brain injured children is their distractability and hyperreactivity, a reasonable intervention procedure might be to provide these children with a minimally stimulating environment. This extensive research report was designed to examine the effects of a minimally stimulating classroom on the cognitive and emotional components of behavior.

Subjects: The design required four classrooms—two experimental and two control. The sample was selected from a total of 460 referrals. Some of the children were already enrolled in special education classes, some had been accepted for special education classes but were not yet in attendance, some children had been referred for special education case study and placement, and other children had been variously referred by health department officials, pupil personnel workers, school psychologists, parents, private physicians, and therapists of one kind or another. Prediagnostic screening eliminated all but 67 of the children, each of whom displayed specific learning disabilities. A specific requirement of the research design was that the children have common learning and behavioral response patterns and that half of them have conclusive medical and neurological evidence of injury to the central nervous system. Although the same behavior and learning problems were present in the remaining subjects, there was no gross evidence of central nervous system damage. After receiving parent consent (all but one parent consented to having his child included in the program) and after more intensive screening, 46 children were designated as possible candidates. They then received a more intensive examination including (in the following order) psychological testing, pediatric examination, neurological examination, speech and hearing testing, electroencephalogram, and psychiatric evaluation. Finally, a staff conference was held and 40 of the 46 children were selected. There were 37 boys and 3 girls. (A detailed description of the physiological and psychological characteristics of each child is included in the report.)

The 40 children were separated into four groups matched in terms of chronological age, mental age, IQ, Stanford-Binet mental age range, instructional or achievement levels in school, level of perseverative, hyperactive behavior, ratio of students without previous experience in special education classes, and diagnostic evidence of central nervous system damage. The following data are reasonably representative of the four groups: average CA, 8-1; average MA, 78 months; and average IQ, 80.3. The sample of four teachers was selected from a group identified as exceptional by school supervisors, pupil personnel workers, and psychologists. One of the two teachers who had taught special classes was assigned to the experimental class and the other to the control class.

Procedure: The experimental program was derived from Cruickshank's modification of the Strauss Lehtinen (1947) concept of education for brain injured children incorporating four basic principles: (a) the reduction of environmental space, (b) the reduction of unessential visual and auditory environmental stimuli, (c) the establishment of a highly structured daily program, and (d) the increase of the stimulus value of the instructional materials themselves.

The experimental classrooms were located some distance from the main work and play areas of the same school. The windows of the classrooms were painted with an opaque substance and all extraneous stimuli were removed. Sliding doors covered various storage cabinets and the wardrobe closets. The rooms were painted so as to minimize the contrast between the woodwork and the walls, teacher costumes were devoid of jewelry, and dresses were of one color. The two control rooms were located in different schools, one old building and one modern building, and only moderate modifications were made in them.

The two teachers of the experimental classes were given a six week training program which included theory, methods, and supervised practice teaching including the preparation of materials and specific instructional aids. (The training program is described in detail in the book and variously includes a discussion of the kinds of materials necessary for children who are distractible, perseverative, or who show perceptual motor dysfunction. Explanations of the reasons for the children's failure to pay attention and other behavioral deviations were given.)

In addition to the four assigned teachers, each classroom was also assigned a teacher assistant, described as a woman with the same general characteristics of the head teacher with the exception of no formal academic training in an accredited school of education. The experimental teacher assistants were included in the six week training program.

A pretest-posttest design was employed. The following tests comprised the battery: Stanford-Binet, Form L (1937 Revision), Goodenough Intelligence Test, Block Design and Coding Subtests from the WISC, Bender-Gestalt, Vineland Scale of Social Maturity, Ammons Full Range Picture Vocabulary Test, Marble Board Test, Tactual Motor Test, Syracuse Visual Figure-Background Test, Rorschach, Metropolitan Readiness Test, and Stanford Achievement Test. During the posttest session it was decided not to include the Block Design and Coding Subtests from the WISC, the Marble Board Test, and the Metropolitan Readiness Test. Results are reported, therefore, for seven of the original pretests.

Results: The results are reported in enormous detail and cannot be described completely here. An effort will be made to represent the general substance of the findings, but the reader will need to carefully examine the data for specific outcomes.

For each of the tests in the battery, comparisons between pretest and posttest scores for each of the four classrooms were made, as well as comparisons between gains for the control classes relative to gains for the experimental classes. A total of 64 statistical tests of significance were used to assess the change scores. A total of 19 of these comparisons were statistically significant at the .05 level or less (a few comparisons were significant at the .10 level). Seven of the significant differences indicated improvement for the experimental group, and one of the differences (Goodenough Intelligence Test) indicated a loss for the experimental group. Five of the differences indicated an insignificant loss for the control group, whereas two of the comparisons indicated insignificant loss for the experimental groups. Statistical tests involving change scores for the pooled control classes and pooled experimental classes yielded 11 statistically significant gains for the experimental group and five statistically significant gains for the control group. Gains for both the experimental classes were especially prevalent on the various measures of the Bender-Gestalt Test, suggesting that the experimental treatment was especially effective in dealing with this component of the children's behavior. In view of the heavy emphasis given in the curriculum to visual motor activities, this result certainly provides support for the use of the specific curriculum materials. Since neither the control nor the experimental groups improved significantly on the Stanford-Binet or the Goodenough (recall that one of the experimental groups showed a significant loss on the Goodenough) and since both groups showed significant improvement on the Vineland and the Syracuse Visual Figure-Background Test, the conclusion is not yet warranted that the minimal stimulation component of the experimental classrooms contributed much to the children's general development. The results are consistent with the view that children show generally more rapid development when placed in small classes under the guidance of an extremely competent teacher.

The next set of comparisons concerns the differences in performance by the combined control groups on the posttest in contrast to the combined experimental groups on the posttest. This comparison assumes equal initial performance, an assumption that was not always met. In those instances where one or the other group performed better on the pretest, no correction was made on the posttest analyses, making interpretation of the posttest differences difficult. Disregarding this problem, the statistical analyses resulted in one significant difference which occurred on one of the subscores of the Bender-Gestalt (incorrect elements). In this case the experimental group showed greater improvement than the control group. All other comparisons were not statistically significant, indicating that at the end of the school year both the control and experimental groups had, for the most part, similar scores on the test battery. Again, these results would *not* provide support for the minimal stimulation classroom condition.

Performance on the Ammons Full Range Picture Vocabulary Test (FRPV), the Tactual Motor Test, the Marble Board Test, and the Block Design and Coding Subtests from the WISC were only assessed on the pretest. In general terms, performance of the control and experimental groups on these tests was quite similar—that is, there were no statistically significant differences. The Tactual Motor Test and the Stanford Achievement Test were too difficult for the majority of children, so that test scores are reported for those children who were able to perform. It should be noted that on the Stanford Achievement Test many more children were able to handle the material on the posttest than on the pretest, but there were no statistically significant differences between the experimental and control groups. As might be anticipated, the performance of the children on the remainder of the tests was below average, with performance generally corresponding to the Stanford-Binet IQ level.

The Rorschach Test was administered on both a pre- and posttest basis, but the response output of the subjects was too small to warrant statistical or clinical analyses. Data, therefore, are not presented on this test.

The children in both the control classes and the experimental classes were followed for one year after termination of the experimental period. These data provide a basis for assessing how the two groups of children performed after they were returned to the more typical classroom situation. The test battery for the followup assessment consisted of Stanford-Binet Form L, the Bender-Gestalt, the Syracuse Visual Figure-Background Test, the Goodenough Draw-a-Person Test, the Block Design and Coding tests from the WISC, the Vineland Scale of Social Maturity, and the Stanford Achievement Test. The results of the multitude of statistical analyses indicate that there were no statistically significant differences in academic achievement between the experimental and control groups. The data do indicate, however, that both groups of children showed statistically significant improvement during the followup year.

Psychiatric evaluations are presented in considerable descriptive, but not quantitative, detail. Although it is difficult to derive conclusions from this material relevant to the purposes of the study, it does provide useful information about the psychiatric characteristics of the children enrolled in the study.

Comment: A project as large and as comprehensive as this one is difficult to evaluate in the short amount of space available. It would be a simple matter to identify a host of uncontrolled variables and simply dismiss the findings on that basis. Such an approach would, however, be an admission that research in the naturalistic classroom setting is of utterly no value. This position is untenable because, in the final analysis, all intervention procedures will have to be tested under classroom conditions or be of little value to educators. Anyway, the authors were quite careful to indicate the major sources of uncontrolled variation and to indicate other sources of ambiguity in interpreting their results.

Perhaps the major question that can reasonably be asked, in spite of the methodological problems, is whether or not the data lend support to the general hypothesis that a minimal stimulation classroom is significantly beneficial for the education of "brain injured" children. A careful consideration of all the data fails to provide a convincing case for the hypothesis. It is true that there were more statistically significant gains among the experimental classes than among the control classes, but the vast majority of these gains occurred on the various scoring dimensions used for assessing performance on the Bender-Gestalt Test. The independence of these scoring categories was not demonstrated. It should also be recalled that the experimental classes received special training in the perceptual motor area, which may have contributed to their superior performance on the Bender-Gestalt. It may be that such training is only effective under minimal stimulation conditions, but this assumption is unlikely. In all probability, had the controls received the same perceptual motor training, the differences would have been reduced. Finally, the benefits of improved Bender-Gestalt performance are hard to find in that both controls and experimentals did not perform differentially in terms of academic achievement. Thus, the pattern of gains shown on the other tests is highly similar for both the control and experimental classrooms, suggesting that a variable other than the physical environment of the classroom was operating. One might speculate that this variable was the teacher, who in all instances and by all accounts was extraordinary.

Two kinds of information were unfortunately omitted from the research report. The intercorrelations among the various test measures would have been of both theoretical and practical significance. In theoretical terms, such information would provide a basis for comparing the structure of abilities among the sample children with the general population. Comparison of pre- and post-intercorrelation matrices would have indicated whether patterns of cognitive abilities were influenced by the intervention experience. In a practical sense, the intercorrelation matrix would have indicated which tests were tapping the same abilities and were therefore redundant. Subsequent investigators could then delete these tests from their battery, saving themselves both time and money. The second omitted bit of information concerns the pattern of improvement among individual children. Examination of the standard deviations suggests that, in some instances at least, the children were not uniformly influenced by the intervention experience. In view of Gallagher's position, it would have been interesting to see if the apparently non brain injured children were differentially affected in comparison with the brain injured children. Such data would have also been relevant to Cohn's (1964) position that considerable variation exists among groups of brain injured children. Finally, the pretest data might have been used to predict gain scores so that those aspects of pretest performance that are more predictive of improvement—relative to the specific intervention experience—could have been identified.

There is little doubt that more studies of this kind will be necessary before specific educational prescription can be made with any degree of confidence. Cruickshank and his associates have provided a basis for further experimentation and it can only be hoped that other investigators will pick up where they have left off.

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6

Orthopedic Disabilities and Special Health Problems

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This chapter contains a series of studies about children with physical disabilities, including children with cerebral palsy. The paucity of research involving children with special health problems is of great concern to persons involved in their education and rehabilitation. There are many reasons why it is difficult to design valid investigations of so heterogeneous a population, and it is of special interest that a large number of the studies reviewed here were conducted as doctoral research.

The chapter is organized around four topics: psychological characteristics, family organization and attitudes, societal attitudes toward disability, and education.

PSYCHOLOGICAL CHARACTERISTICS

The six studies reviewed here represent attempts to assess the meaning of disability for individuals through study of such factors as body image, self concepts, and visibility. Psychological stability and adjustment to the environment are areas of obviously needed investigation.

Abercrombie, M.L.J., and Tyson, M. C. Body Image and Draw-A-Man Test in Cerebral Palsy. *Developmental Medicine and Child Neurology*, 1966, *8*, 9-15.

Purpose: To test the hypothesis that poor Goodenough drawings in cerebral palsied children may be a reflection of general weakness in drawings and not necessarily a weakness in body image.

Subjects: Twenty-four cerebral palsied children (12 boys and 12 girls) and 23 six year olds, believed to be of normal intelligence.

Procedure: The Goodenough Draw-A-Man Test was administered and a mental age obtained. Subjects were also asked to copy a sheet of simple figures, from which a "copying" mental age was estimated. WISC scores were available for the cerebral palsied children.

Results: CA and MA of cerebral palsied children covered a wide range, while the group of normal children was comparatively homogeneous. For cerebral palsied children, MA's were lower than CA's for all children. For cerebral palsied children, the Goodenough MA tended to be slightly higher than copying MA, rather than lower, if it were thought to reflect a "body image" disorder. The investigators concluded that there was no reason to adduce any body image disorder from these results. They questioned the Goodenough as a projective test because normal children's drawings often manifest peculiarities which might be regarded as signs of physical impairment. Many drawings of "impairments" made by cerebral palsied children may come within the range of drawings made by normal children of similar MA. One cannot diagnose "body image disorder" from single drawings.

Comment: The validity of the assumption of normal intelligence for the noncerebral palsied group seems questionable.

Centers, Louise, and Centers, R. A Comparison of the Body Images of Amputee and Non-Amputee Children as Revealed in Figure Drawings. *Journal of Projective Techniques and Personality Assessment*, 1963, 27, 158-165.

Purpose: To investigate differences in body images of amputee and nonamputee children in the area of the missing limb, and to determine if amputee children have more conflict and defensiveness about their bodies than nonamputees, as reflected in self drawings.

Subjects: Twenty-six children, ranging in CA from 5 to 12, with upper extremity amputations or anomalies, were matched for sex, CA, and MA with 26 normal children.

Procedure: Subjects were asked to draw three figures, one of each sex, as well as a self portrait. Three clinical psychologists judged whether the drawings were done by an amputee or a nonamputee child and briefly noted the cues or signs used in making their decisions. Three different judges further rated the self portraits.

Results: Of the three drawings, only the self portraits revealed differences between the groups in the representations of body image.

These differences were confined primarily to treatment of the arms of the figures and only approached significance. No significant differences were found between the drawings of the two groups as indicators of conflict and defensiveness.

Comment: There is lack of experimental control for length of time since the amputation may be a limiting factor in the interpretation of these results.

Kinn, Winifred T. Self Reports of Physically Handicapped and Non-Handicapped Children. *Dissertation Abstracts,* 1964, *24,* 5196.

Purpose: To assess (a) self concepts, (b) the congruency of self concept and ideal self of handicapped and nonhandicapped students, and (c) self reports of students with various categories of physical disability.

Subjects: A group of 72 testable children in grades four through nine of a special school for physically handicapped children in Baltimore, Maryland, were matched with a group of nonhandicapped students in regular elementary and junior high schools on sex, race, socioeconomic level, grade, IQ, and reading level.

Procedure: Data on physical factors, interpersonal relations, skills, capacities and abilities, meaningful objects, situations and events, and adjustment were collected by a Q sort and the Mental Health Analysis, Elementary Form (Grades 4-8).

Results: In self reports, physically handicapped children stated that they had fewer opportunities for socialization, fewer close personal relations, and less physical adequacy than nonhandicapped children. No significant differences were found between the two groups in the reports of capacities, abilities, and skills. Handicapped children did not report themselves as having different goals or outlooks on life than nonhandicapped children but indicated less goal realization in work and recreation. Handicapped children, who scored lower in the area of adjustment, had more feelings of inadequacy and used more nervous manifestations.

No significant differences were found in four aspects of self concept among children with various categories of disability, but significant differences were reported among children with various handicaps in adjustment. Significantly greater congruency of self concepts and ideal self was reported by the group of physically handicapped children than by the goup of nonhandicapped children. However, children with nonvisible handicaps were not significantly different in reports of self and ideal self congruency from normal children. Fewer negative descriptions of the self and ideal self were reported by the handicapped group, suggesting an inability to accept threatening concepts into their self pictures.

Nussbaum, J. An Investigation of the Relationship between the Self Concept, Mothers' Concept and Reality Orientation of Adolescents with Cerebral Palsy. *Dissertation Abstracts,* 1962, *22,* 4410-4411.

Purpose: To investigate the relationship of mothers' concepts and the self concepts of cerebral palsied adolescents regarding: (a) task performance, (b) social capacities, (c) overall vocational potential, and (d) overall intelligence.

Subjects: Thirty cerebral palsied adolescents and their mothers. The adolescents ranged in CA from 15 to 21, and were participating in a cerebral palsy work evaluation project at the Institute for the Crippled and Disabled in New York City.

Procedure: Data were obtained at the beginning of a seven week work evaluation period by interviewing both the adolescents and their mothers. Capacities were also measured objectively at the end of the work evaluation period.

Results: Significant but low correlations between adolescents' self concepts and their mothers' concepts were found in task performance, social capacities, and vocational potential, while no significant relationship was found in the area of overall intelligence. Although mothers showed some reality concepts, especially in the area of vocational potential, no such concepts in any of the areas were shown by the adolescents.

Richardson, S. A., Hastorf, A. H., and Dornbusch, S. M. Effects of Physical Disability on a Child's Description of Himself. *Child Development,* 1964, *35,* 893-907.

Purpose: To investigate the effects of physical disability on a child's perception of himself.

Subjects: One hundred seven handicapped and 128 nonhandicapped Caucasian, Negro, and Puerto Rican boys and girls aged 9 to 11 years. Severity of handicaps ranged from slight to moderate and included cerebral palsy, postpolio impairments, cardiac disorders, diabetes, and various orthopedic disabilities. The subjects were all attending a summer camp for underprivileged city children.

Procedure: Data on each subject were obtained from an interview regarding descriptions of others and self. Sixty-nine empirically derived content categories, obtained from an exploratory study, were used in the analysis.

Results: The handicapped children were found to be very realistic in their self descriptions. Although peer values did not differ between the groups, the handicapped expressed feelings of inability to live up to expectations because of the high priority placed on physical activities. Some sex differences were found with the handicapped group, i.e., girls used nonphysical recreation while boys used humor as a means of gaining acceptance; the boys expressed more concern about aggression. The handicapped as a group showed greater concern with the past than the nonhandicapped, and reflected more physical restriction and less social acceptance both within and without the family.

Smits, S. J. Reactions of Self and Others to the Obviousness and Severity of Physical Disability. *Dissertation Abstracts,* 1964, *25,* 1324-1325.

Purpose: To investigate the relationship between obviousness and severity of physical disability in adolescents to self concept, self acceptance, and how others perceive. The validity of statements in the literature about the minority status attributed to handicapped individuals, the importance of physical beauty for girls and physical strength for boys, and the tendencies toward overprotection or rejection were also investigated.

Subjects: Two hundred one physically disabled adolescents—76 females and 125 males—having IQ's of at least 90, and attending regular schools in the St. Louis area. All were receiving services from the Missouri Division of Vocational Rehabilitation. Disabilities were classified as obvious or subtle, severe or mild, by three judges.

Procedure: Subjects were given a modified Index of Adjustment and Values and were rated by mothers, teachers, and classmates.

Results: Adolescents with mild physical disability attained higher self concept scores than those with severe physical disability. Female adolescents with severe disability had significantly lower self acceptance scores than either mildly disabled female or severely disabled male adolescents. Obviousness and severity of disability were related to ratings of both teachers and mothers. Teacher ratings were higher for disabled females than disabled males. Physically disabled adolescents were rated significantly lower by their classmates than were normal adolescents. Statements found in the literature about the importance of beauty for girls and physical strength for boys were not supported.

FAMILY ORGANIZATION AND ATTITUDES

The importance of family attitudes in adjustment to personal disability has been clinically recognized for some time, but the impact of disability upon members of the family group has only recently become a research topic. These four studies, three of which were doctoral dissertations, represent a significant contribution to this area.

Barclay, A., and Vaught, G. Maternal Estimates of Future Achievement in Cerebral Palsied Children as a Function of Age, Sex, and Degree of Handicap. *American Journal of Mental Deficiency*, 1964, *69*, 62-65.

Purpose: To study parental tendencies toward unrealistic evaluation (overestimation) of growth and development potentials of cerebral palsied children.

Subjects: Mothers of 40 cerebral palsied children, selected because of continuing participation in an outpatient program at a pediatric hospital.

Procedure: The Jensen-Kogan rating scale of parental expectation was administered to subjects and compared to a rating scale, based on the L-M Stanford-Binet and the Vineland Social Maturity Scale, which was filled out by the investigators.

Results: Previous research suggesting that mothers of handicapped children tend to overestimate their child's potential for future achievement was confirmed. There were no significant differences in ratings of girls as compared to boys. Mothers of the mentally retarded tended to overestimate the abilities of their children to a greater extent than other groups. Age and physical impairment were not related to the amount of overestimation.

Hall, W. T. Family Disorganization as Associated with Severity of Handicap (by Cerebral Palsy) of a Minor Child. *Dissertation Abstracts*, 1961, *22*, 1294.

Purpose: To investigate the effect of severity of physical disability in a child on family functioning.

Subjects: Sixty cerebral palsied children who were all under 21 years of age, living at home, and having no siblings with cerebral palsy. One half of the group had been classified as mildly impaired and the rest had been classified as severely impaired.

Procedure: Mothers were interviewed at home regarding family interaction (parents' marital relationship, parent child relationship, and sibling relationship) and family transaction (role performance in family; community relationships; participation in social, religious, and civic groups; job stability; family mobility; economic factors; and recreation and leisure time activity).

Results: Families of severely involved children produced lower family unit/family relationship scores than did families of mildly involved children. The mothers of children with severe physical impairment expressed significantly more feelings of continued guilt, denial, and futility, and showed less adequate ability to adapt to the stress of having a handicapped child in the family. In addition, there was a greater tendency for these mothers to remain at home rather than work in the community. Families of severely involved children moved less often and were more acutely aware of gaps in community services. Families of both the severe and mild groups were similar in transaction patterns. However, the families of the severe group appeared to present a higher risk of potential family breakdown.

Knittel, M. G. A Comparison of Attitudes toward the Disabled between Subjects Who Had a Physically Disabled Sibling and Subjects Who Did Not Have a Physically Disabled Sibling. *Dissertation Abstracts,* 1964, *24,* 4084-4085.

Purpose: To investigate the differences in attitudes toward disability of subjects with a disabled sibling and subjects without a disabled sibling when consideration is given to various grade levels, sex, intelligence, and number of siblings.

Subjects: Forty-five Caucasian, nondisabled children between the ages of 5 and 17 years who had a disabled sibling were matched on age, IQ, grade, number of siblings, and father's occupation with a group who did not have a disabled sibling. Each group consisted of 30 males and 15 females.

Procedure: The following attitude scales were employed: Children's Picture Sociometric Attitude Scale, Attitude Toward Disabled Persons Scale, Attitude Toward Severely Disabled Students Scale.

Results: Grade level of subjects was an important factor in attitudes toward the physically disabled. Older subjects with a disabled sibling received more favorable scores on the attitude scales than younger subjects with a disabled sibling. Younger subjects without a disabled sibling received higher attitude scores than older subjects without a disabled sibling. No significant differences of attitudes were found between sexes, intelligence groups, and number of siblings. Questions about a disabled person's social activities were more favorably answered by subjects with a disabled sibling than by subjects without a disabled sibling.

Comment: The importance of favorable exposure to disability seems clear to the promotion of public education and acceptance.

Morgenstern, M. Maternal Attitudes and Reactions of Normal Siblings in Families with a Cerebral Palsied Member. *Dissertation Abstracts,* 1966, *26,* 4079-4080.

Purpose: To investigate the effects of the presence of a cerebral palsied child in a family on family constellation, maternal attitudes toward children, and the emotional development of normal siblings.

Subjects: Two groups of 60 mothers and 60 children were studied. One group consisted of mothers who had a cerebral palsied son and normal siblings; the other group consisted of mothers with normal children only. The groups were comparable on all other selected criteria. The age range of the cerebral palsied children was from 5 to 17 years; the age range between siblings in each group was not greater than four years.

Procedure: The Semantic Differential Scale, Human Figure Drawings, Children's Personality Questionnaire, and Parental Behavior Inventory were administered. Additional data to supplement the medical records of the cerebral palsied children and the school cumulative records of normal children were gathered by the use of a questionnaire devised by the investigator.

Results: Mothers in the group that had cerebral palsied children showed significantly greater discrepancies in attitudes toward their children than did mothers with normal children only. Siblings of cerebral palsied children found the environment more rejecting and were more hostile, anxious, and fearful than siblings of normal children. Emotional reactions and characteristics of siblings of cerebral palsied children were more intense, and they perceived mothers' behavior more negatively when there was greater discrepancy in mothers' attitudes between the cerebral palsied child and normal siblings.

SOCIETAL ATTITUDES TOWARD DISABILITY

The social psychological effects of disability are explored through these four studies which consider the attitudes of other groups toward disabled children. Growing awareness of the importance of interpersonal reactions to the total growth and adjustment of handicapped children is demonstrated by an increase of relevant research.

Billings, Helen K. An Exploratory Study of the Attitude of Noncrippled Children toward Crippled Children in Three Selected Elementary Schools. *Journal of Experimental Education,* 1963, *31,* 381-387.

Purpose: To explore the attitudes of noncrippled children in grades one, three, and six toward crippled children in an effort to see how factors influencing the development of other stereotypes might influence formation of stereotypes or prejudice toward crippled children.

Subjects: Fifty-four elementary school children randomly selected. There were 18 at each grade level, six from each of three schools of rather distinct socioeconomic levels.

Procedure: Two projective techniques adapted for this study were administered to each subject. Instrument A used a Tell A Story approach with pictures of two seven year old girls (one crippled) as stimuli; subjects were to write a story from which attitudes were assessed. Instrument B was a Complete This Sentence test with three of the 10 sentences related to crippling.

Results: Attitudes of noncrippled children toward crippled children were found to be significantly more unfavorable than their attitudes toward noncrippled children. Attitudes toward crippled children were also found to be related to the grade level (age) of the child expressing such attitudes, i.e., an increase in "unfavorableness" from grade to grade. Children judged by classroom teachers to be high in adjustment demonstrated more unfavorable attitudes toward

Comment: This is further confirmation of the theory of the minority status of those with physical disabilities. The implication for education is clear—it is vital to attempt to prevent the development of unfavorable attitudes toward crippled individuals.

Jaffe, J. M. Attitudes of Adolescents toward Persons with Disabilities. *Dissertation Abstracts,* 1965, *26,* 1199.

Purpose: To investigate attitudes of adolescents toward the disabled, and to relate these attitudes to other subject characteristics.

Subjects: Four hundred seventy-seven high school seniors from four New York and New Jersey high schools.

Procedure: Subjects were assigned at random to respond to one of four stimulus persons described in sketches as an amputee, retardate, former mental patient, or nondisabled individual. Four measures were used: (a) empirically derived evaluation factor, (b) potency activity factor, (c) favorability score, and (d) social distance scale.

Results: The subjects did not demonstrate attitudes of devaluation toward the disabled. The amputee was the most favorably evaluated on all four response measures. Intelligence and socioeconomic status of the subjects were not related to the measures of attitude used. Girls responded more favorably than boys to each stimulus person. The retardate was accorded more favorable traits by those subjects who had had some contact with retarded persons.

Legant, Jean L. A Comparison of Attitudes toward Handicapped Children between Three Groups of Teachers Expressed on a Q-Sort. *Dissertation Abstracts,* 1966, *26,* 5872.

Purpose: To study attitudes of three groups of teachers toward handicapped children.

Subjects: Three groups of teachers: 20 regular classroom teachers, 20 teachers of handicapped children, and 20 teachers who had taken coursework in education of handicapped children.

Procedure: A Q sort of 50 items was constructed from replies to a letter asking teachers to complete the statement: "Handicapped children are ____________." The term "handicapped" included mentally and physically handicapped, emotionally disturbed, and culturally deprived children.

Results: No differences were found between the groups. The author concluded that factors other than either exposure to college classes about such children or actual experience with these children affected the responses given on the Q sort items.

Comment: The adequacy of 50 items to assess attitudes toward all handicapped children may be questionable.

Schoen, L. R. A Study of Practice and Problems in the Integration of Physically Handicapped Children in Regular School Programs. *Dissertation Abstracts,* 1965, *26,* 2083-2084.

Purpose: To investigate practices of integration of physically handicapped children, factors that relate to the success or failure of integration programs, and the opinions and attitudes of professionals in the field.

Subjects: One hundred thirty-one leaders in special education.

Procedure: Eighteen subjects were interviewed in person and 54 by correspondence. Opinions and recommendations of the remaining 59 subjects were determined by assessing their publications.

Results: Integration was considered to be the actual participation of physically handicapped children in as many regular school activities as possible. The success of integration is determined by successful experiences of the physically handicapped child, the presence of secondary handicaps (e.g., speech defects, mental retardation), and the combined efforts of those adults who regularly come into contact with the individual. Other variables, such as the physically handicapped child's background of experiences and the teacher of the integrated class, will have direct bearing on the success of the program of integration.

Comment: The investigator noted a trend toward a reality oriented program of special education, with emphasis on providing as normal an environment as possible during the handicapped child's formative years. He further noted that the special education facility's proximity to a regular school campus provided an environment most conducive to integration.

EDUCATION

There is a paucity of research relating to educational placement, curriculum, and methodology. However, the seven studies reviewed here raise some important issues for special educators of children with orthopedic disabilities.

Arwood, F. An Inquiry into the Educational Opportunities of the Physically Homebound Child in North Carolina with Proposals for a Home Instruction Program. *Dissertation Abstracts,* 1964, *24,* 3159.

Purpose: To determine the need for home instruction in North Carolina, to evaluate present provisions, to investigate methods in instruction used, to compare North Carolina's provisions with other states, and to suggest improvements for the North Carolina program.

Procedure: Information was obtained from state education authorities in North Carolina and other states, from local health departments, from local school systems in North Carolina, and from a review of the literature on home instruction.

Results: A wide variety of disabilities, diseases, and conditions may prevent a child from attending public school temporarily or permanently. The numbers of homebound children in the United States were unknown, but in North Carolina only one in five known cases was receiving home instruction. Special classes, home tutors, and telephone teaching were methods of instruction often recommended.

A majority of states have legislative provisions for home instruction and, in North Carolina, provision is permissive. A majority of the programs are financed by parents or charitable institutions.

Comment: Arwood pointed to the need for accurate census, mandatory provisions (presumably with state funds), and exploration of telephone, radio, and television methods of home instruction.

Carr, Dorothy B. Teleteaching—A New Approach to Teaching Elementary and Secondary Homebound Pupils. *Exceptional Children,* 1964, *31,* 118-126.

Purpose: To evaluate the educational progress of children receiving home instruction by teleteaching in Los Angeles.

Subjects: Twenty-six students (10 high school and 16 elementary) who were enrolled in teleteaching in Los Angeles during the fall semester, 1963.

Procedure: The California Achievement Tests, Form W, were administered in January, 1964. Opinions of pupils, their parents, teleclass teachers, and regular teachers with whom the pupils enrolled following their return to school, were recorded.

Results: Most students felt their study habits improved; they had few difficulties in understanding and following teleclass teachers' instructions. A majority felt they had more teacher attention than in regular grades. Students worked independently of parents. Teleclass teachers reported that pupils were responsive; a majority of students went beyond assigned tasks. Regular teachers were generally impressed by how students on teleclass teaching had kept up with classmates. Semester grades were comparable to previous grade averages and indicated satisfactory progress.

Comment: The author made several recommendations for improvement which seem quite practical and offer possibilities for further research.

Collins, H. Success and Failure in Vocational Rehabilitation of the Cerebral Palsied. *Dissertation Abstracts,* 1965, *25,* 319.

Purpose: To evaluate vocationally cerebral palsied clients and to classify their vocational potential.

Subjects: Data from the Des Moines, Miami, Philadelphia, and St. Louis projects—225 subjects available for study, of whom 94 met the criterion of success.

Procedure: Fifty randomly selected successful clients were compared with 50 randomly selected unsuccessful clients on IQ, length of time in school, clarity of speech, and manual dexterity.

Results: Manual dexterity was significantly related to success ($p < .05$). Clients with better dexterity also tended to have better speech.

Comment: The investigator felt that manual dexterity alone could predict vocational success at a high degree of confidence, and that sheltered workshop facilities would be appropriate for unsuccessful clients to help them reach maximum vocational rehabilitation.

Machek, O., and Collins, H. A. Second Year Review of Evaluating and Classifying the Vocational Potentials of the Cerebral Palsied. *Archives of Physical and Medical Rehabilitation,* 1961, *42,* 106-108.

Purpose: To evaluate and classify the work ability and/or potential of the cerebral palsied by use of the job sample technique.

Subjects: Seventy-three out of 84 clients (37 females and 36 males) admitted to the Work Classification and Evaluation Project (St. Louis, Missouri) completed a seven week program. Subjects' ages ranged from 16 to 47 years with a mean CA of 24 years. Eighty-four percent of the subjects had severe speech problems and 18 percent were nonambulatory. Of those who were ambulatory, 61 percent had gait disturbances.

Procedure: A team of seven specialists evaluated four areas: (a) manual dexterity, (b) vocational tools, (c) vocational equipment, and (d) academic skills. There were 14 basic categories of samples which included 77 job areas; these 77 job areas included 171 samples.

Results: A wide range of job sample performance was noted. Very few could be placed in competitive employment. The investigators discovered a significant relationship between years completed in school and work potential. Those staying in school longer seemed to have developed more acceptable personalities and were better adjusted—which makes them more acceptable as employees. Clients from smaller communities adjusted more readily to the work environment of the project than metropolitan clients. In successful cases, the ability to handle money and to work with others was significant. The investigators felt that adjustment was the most important single factor.

Phillips, C. J., and White, R. R. The Prediction of Educational Progress among Cerebral Palsied Children. *Developmental Medicine and Child Neurology,* 1964, *6,* 167-174.

Purpose: To examine the educational achievement of a mixed group of cerebral palsied and other physically handicapped children in order to discover any basic differences between those whose handicap may have deprived them of early sensorimotor experiences and those whose handicap allowed them to benefit from normal motility in infancy.

Subjects: Pupils of a residential school (England) for physically handicapped children. There were 23 subjects in the CD group (congenital disability—cerebral palsy) and 32 subjects in the PH group (physically handicapped) selected by medical criteria from the whole school population.

Procedure: Regular school achievement tests in reading and arithmetic from standardized measures, given with adaptations, were used. The Revised Stanford-Binet was administered to all children who attended the school.

Results: Significant differences appeared between groups in both reading and arithmetic. When age and measured intelligence were allowed for, there was a significant difference between the two groups in acquisition of reading and arithmetic skills. Stanford-Binet IQ's were poorer predictors for cerebral palsied children than for those with other physical handicaps.

Comment: The investigators ventured that prediction of response to educational opportunities (by such tests as the Stanford-Binet) may be invalidated by perceptual deficiencies and early sensorimotor deprivation.

Stonehill, H. An Analysis of the Growth in Different Types of Reading Skills Made by Handicapped Junior High School Pupils on Home Instruction: A Study of the Growth in Specific Reading Skills of Homebound Pupils with Different Types of Physical Disabilities. *Dissertation Abstracts,* 1964, *25,* 5754.

Purpose: To determine if growth in specific reading skills made by homebound pupils with certain physical disabilities was significantly different than that of homebound children with other physical disabilities after one year of home instruction.

Subjects: One hundred two junior high school pupils who received home instruction during the school year 1962-1963.

Procedure: Questionnaires completed by the home teachers and reading tests administered to subjects were used in the data collection. Variables considered were disability, IQ, home environment, beginning level of reading skill achievement, and level of reading achievement at the end of one year.

Results: No significant differences were found in mean gains among seven disability groups. No significant relationship was found to exist between extent of disability in each of the disability groups and mean gains, or between age of onset of disability of the groups and mean gains in achievement.

Comment: The investigator suggested that teachers of home instruction should not attempt to classify students according to type of disability, severity, or age of onset, since no patterns of reading strengths were discernible among the disability groups studied.

Valney, Evabelle D. D. Factors Relevant to Success in a Business Training Program for the Physically Handicapped Young Adult in a Vocational Rehabilitation Center. *Dissertation Abstracts,* 1966, *26,* 6896.

Purpose: To determine if a significant difference exists between students who are successful and those who fail in a rehabilitation program in business training, with consideration given to age, intelligence, sex, educational achievement, and personal-social adjustment.

Subjects: Thirty-six students from the Business School at the Woodrow Wilson Rehabilitation Center in Fisherville, Virginia.

Procedure: Students were divided into two groups after their age, sex, and major disability were noted. Group A consisted of students rated as well adjusted and probable successes; Group B consisted of students rated as poorly adjusted and probable failures. Assignment to groups was made by a teacher counselor who rated the trainees with a five point graphic scale on social adjustment, acceptance of disability, probable success in program, and probable vocational success after the program. Each trainee was administered the Wechsler Adult Intelligence Scale, the Wide Range Achievement Test, and the Syracuse Scale of Social Relations.

Results: Twenty of the 36 students were determined to be successful; 16 were unsuccessful. Age, sex, educational achievement, and IQ did not have sufficient predictive reliability to determine which ones would succeed and which ones would fail. Teacher counselor ratings were better predictors of success than standardized rating scales.

SUMMARY

The number, range, and quality of these studies make it certain that progress has been made, but much is yet necessary. While studies of changing incidence may concern the medical profession, it seems clear that of greater importance to psychologists, educators, and other behavioral scientists will be studies which are directed at the behavioral consequences of disability as well as toward the use of newer and different teaching and learning strategies.

7

Speech, Language, and Communication Disorders

James O. Smith
Thomas C. Lovitt

According to McDonald (1964), speech is one of several modalities through which language is utilized. Spradlin (1963) defined language as the verbal and gestural responses of a speaker, while communication refers to the involvement of language in a process of interchange.

Defects or disorders of the total speech system arise when an individual is unable to manipulate certain verbal components. Van Riper (1963) stated that "Speech is defective when it deviates so far from the speech of other people that it calls attention to itself, interferes with communication, or causes its possessor to be maladjusted [p. 16]." Following such definitions, speech defects were commonly categorized as articulation, stuttering, voice disorders, and speech problems associated with cleft palate, aphasia, cerebral palsy, and mental retardation.

Many problems have continued to result from definitional issues as well as categorical schemes which confound physical and/or mental differences with a wide variance of expressive and receptive abilities. It appears that speech and language behavior can be categorized more meaningfully apart from etiological divisions. For example, one would be more precise to discuss the articulation, fluency, or rate problems of a mentally retarded child in regard to therapeutic implications than to simply examine the "speech of the mentally retarded."

To investigate the research in this area, the authors suggest a broad categorical scheme adapted from that proposed by Schiefelbusch (1963): (a) articulation—the way sounds are formed and joined together; (b) fluency—the continuance of vocal output, related to the auditor's judgment of appropriate smoothness and rhythm; (c) phonation—the production of voice through vibration of the vocal folds and as modified by the resonators; and (d) language—the structured system or code that allows communication and is broadly inclusive of verbal and gestural behaviors. Such a categorical scheme will, for example, allow research on articulation to be viewed in the context of operational behavioral description or modification rather than in relationship to various physiological and mentation problems, i.e., cleft palate, cerebral palsy, and mental retardation.

It is encouraging to note the advances made in serving those with speech, language, or communication disorders. Mackie (1965) estimated that about one-half of speech handicapped children now have access to remedial programs. This area of service has perhaps the greatest numerical increase over the past 15 year span. At last reporting, enrollment trends indicated an approximate 50-60 percent increase during the brief span between 1958 and 1963. These service needs, the growth and development of training programs, and federal support for research and training have all contributed greatly to the product reviewed here.

ARTICULATION DISORDERS

Articulation was described by McDonald (1964) as one of several processes involved in the production of speech. Disorders of articulation have been associated with one or more psychological or physiological disabilities such as a hearing loss, a dental problem, an auditory discrimination deficit, restricted motility, degree of palatopharyngeal closure, or emotional disturbance. Depending upon the anomaly believed to be associated with articulation disorder, many researchers have attempted to describe relationships between the degree of articulation proficiency and a related physical or emotional involvement. The underlying premise of this type of articulatory diagnosis and description, that of attempting to determine a psychological or biological correlate to inadequate articulation, has prompted some clinicians to design programing procedures based on etiological description. Meanwhile, other diagnosticians and clinicians have become more concerned with a functional or empirical description of articulatory deviation and have recommended training programs based on observed speech dimensions.

Since some controversy does exist as to the diagnosis and treatment of children with articulatory deviations, an attempt is made in this review to present varying approaches of describing and training children with articulation defects.

The descriptive studies that have been reviewed are representative of some of the current issues involved in the description of articulation behaviors and related environmental or physical factors. Investigations have been chosen that relate to discrimination training, the problems of maturation and dentition, and biological involvements such as restricted motility and palatopharyngeal closure.

The training or modification studies chosen for this section relate to varying approaches and methods used to alter the articulatory features of speech. The efficacy of speech therapy with retardates is discussed, group versus individual training results are described, an investigation of discrimination training and articulation is offered, and a modification study involving operant principles is presented.

Aungst, L. F., and Frick, J. V. Auditory Discrimination Ability and Consistency of Articulation of /r/. *Journal of Speech and Hearing Disorders,* 1964, *29,* 76-85.

Purpose: To investigate the hypothesis that consistency of articulation is more directly related to the ability to judge one's own speech productions as correct or incorrect than to the ability to discriminate between paired auditory stimuli presented by another speaker.

Subjects: Twenty-seven school children between eight and ten years of age who exhibited functional articulation defects of the /r/ sound only.

Procedure: A sentence deep test of articulation for the /r/ sound and four auditory discrimination tests were administered to each subject. Three new tests were constructed to measure the ability to judge one's own speech productions: (a) when compared to the productions of another speaker, (b) when heard on a recording, and (c) while in the act of speaking. The Templin 50 Item Test of Auditory Discrimination was selected to represent traditional tests of speech sound discrimination.

Results: Correlations among the scores on the five tests indicated that (a) the ability measured by the traditional test is unrelated to the ability to judge one's own speech productions as correct or incorrect; (b) the traditional test measures an ability which is not related to consistency of articulation, and therefore, such a test would seem to be of questionable value in diagnosis, therapy, and research; and (c) the ability to judge one's own speech productions is significantly related to the consistency of articulation, so these tests should prove to be valuable in diagnosis, therapy, and research.

Comment: The author has responded to the issue of the relationships between auditory discrimination ability and articulation proficiency. It is demonstrated that for young children, when the /r/ sound is the criterion, the ability to judge one's own speech production is more related to consistency of articulation than to the ability to discriminate between paired auditory stimuli. The possibility is raised that perhaps children with a specified articulatory problem have been considered as a homogeneous group. With some children, and with certain speech sounds, auditory discrimination training is perhaps the most profitable training pursuit, while with other children and other speech sounds, direct vocal training or self monitoring is perhaps the most expeditious training procedure.

Prins, D. Relations among Specific Articulatory Deviations and Responses to a Clinical Measure of Sound Discrimination Ability. *Journal of Speech and Hearing Disorders,* 1963, *28,* 382-388.

Purpose: To look for evidence among children with developmental articulation disorders of specific relations among various deviations of articulation and scores on a clinical measure of sound discrimination ability.

Subjects: The experimental group was composed of 26 first grade children with functional defects of articulation. The control group was composed of 19 first grade children who were judged by the experimenter to have normal articulation. All subjects passed audiometric screening at 20 dB. Mean IQ scores on the Ammons Vocabulary Test were 116 for the experimental group and 117 for the control group.

Procedure: An articulation test of the picture type was administered to both experimental and control groups. Experimental subjects misarticulated three or more consonant sounds which were adequately produced by 70 percent or more of the children of equivalent age in Templin's study (1957). Errors of articulation were analyzed using a system developed by the experimenter (Prins, 1962). Articulatory deviations were divided into three major error classes: phonemic substitutions, nonphonemic substitutions, and sound omissions. The first two categories were subdivided further depending upon whether the phoneme intended by the child was altered in manner of articulation, place of articulation, or voicing; whether these alterations occurred singly or in combination; and the degree to which place of articulation was changed. The Wepman Auditory Discrimination Test was administered to both experimental and control groups.

Results: Correlation coefficients were computed between the score on the Wepman Test, specific types of articulatory deviations, and the total number of articulatory errors. The only significant correlation was between one-degree, place-change articulatory errors and the Wepman score; subjects who had high proportions of articulatory errors characterized by changes in place of articulation tended to do poorly on the Wepman Test. Interestingly, both the correlation between the total number of articulatory errors and the Wepman score, and the difference between the mean Wepman scores for the experimental and control groups were not significant.

Comment: The results suggest that there may be a relationship between place change errors of articulation and the ability of a child to discriminate articulatory place changes when they are used to contrast phonemes in word pairs spoken by another person. This result appears to have implications for both motor and linguistic theories of speech perception. The possibility that language processes and articulatory movement feedback are important determinants of sound discrimination ability invites the development of new approaches to sound discrimination training.

Dickson, S. Differences between Children Who Spontaneously Outgrow and Children Who Retain Functional Articulation Errors. *Journal of Speech and Hearing Research,* 1962, *5,* 263-271.

Purpose: To determine differences in motor proficiency and auditory discrimination ability between children who have outgrown functional articulation errors and those who have not, as well as to determine differences in the emotional characteristics of the parents of these two groups.

Subjects: Sixty first, second, and third grade children in four western New York schools, who during the year before had been judged to have functional articulation defects. One-half of the group had spontaneously outgrown these defects and the rest had retained them.

Procedure: The Oseretsky Tests of Motor Proficiency and the Templin Speech Sound Discrimination Test were administered to the two groups, and the Minnesota Multiphasic Personality Inventory was given to their parents.

Results: Children who retained speech errors were found to be inferior in gross motor tasks, but there was no difference between the two groups in speech sound discrimination ability. There were some indications of greater "emotional immaturity and instability" in mothers of children who retained errors than in mothers of children who had outgrown them.

Comment: There were two theoretical formulations proposed as a result of this investigation. One suggested that a pervasive constitutional weakness plus adverse environmental influences served to permit the functional speech errors to persist. An alternate hypothesis was that the immature and unstable characteristics of the mother were contributing factors to retention of speech errors.

Bankson, N.W., and Byrne, Margaret C. The Relationship between Missing Teeth and Selected Consonant Sounds. *Journal of Speech and Hearing Disorders,* 1962, *17,* 341-347.

Purpose: To investigate the influence of missing teeth on production of initial, medial, and final /s/, /ʃ/, and /f/; and medial /z/.

Subjects: Three hundred four kindergarten and first grade children whose teeth had been present in May, 1960, and who had not received any special speech training.

Procedure: Picture articulation tests were administered by a group of seven examiners. A posttest was administered four months later, and information about the presence or absence of teeth was recorded. The criterion for missing teeth included one, all, or any combination of the upper and lower medial and lateral incisors or canine teeth.

Results: A statistically significant relationship was found between production of the initial, medial, and final /s/ and presence or absence of teeth among children who had used the sound correctly on a pretest. This was not true for the initial, medial, and final /ʃ/ and /f/, and medial /z/. The percentage of children who changed from correct to incorrect production of the initial and final /s/ following the loss of a combination of two or more teeth was higher than the percentage of children who did not change following the loss of teeth.

Comment: The study attempts to investigate the problem of whether or not missing teeth cause articulation problems. One must keep in mind that loss of incisors is only one possible cause of a defective /s/ and that missing teeth will not influence the speech patterns of many children.

Hixon, T., and Hardy, J. Restricted Motility of the Speech Articulators in Cerebral Palsy. *Journal of Speech and Hearing Disorders,* 1964, *29,* 293-306.

Purpose: To investigate the relationships among speech defectiveness, rates of repetition of certain consonant-vowel syllables, and rates of repetitive nonspeech movements of the speech articulators observed in a group of children with cerebral palsy.

Subjects: Twenty-five children diagnosed as spastic quadraplegics and 25 diagnosed as athetoid quadraplegics. Mean CA for the group was 10-6. Each subject had passed an audiometric test at 20 dB from 250 to 8,000 cps and was in the dull normal range of intelligence.

Procedure: Each subject was asked to execute five nonspeech movements and four speech movements. The nonspeech movements were (a) opening and closing the lips with teeth together, (b) retracting and rounding the lips, (c) raising the tongue to the alveolar ridge and lowering it, (d) lateralizing the tongue from one corner of the mouth to the other, and (e) opening and closing the jaw. The speech movements involved repeating the syllables /mʌ/, /dʌ/, /gʌ/, and /pʌ-tʌ-kʌ/. The measure of speech defectiveness was based on the rating of a 15 second taped sample of connected speech.

Results: An analysis of the nine independent variables revealed that the repetition of three speech sounds, /mʌ/, /dʌ/, and /gʌ/, exhibited mean rates twice those of all nonspeech variables except those of opening and closing the jaw. These same three speech variables exhibited correlations of —.70 or better with judged speech defectiveness. Meanwhile, the single best predictor of speech defectiveness was the repetition of the syllable /gʌ/, which correlated —.75 with the dependent variable, judged defectiveness. The independent variable that proved to be the weakest predictor of speech defectiveness was lateralization of the tongue. A multiple correlation was computed between the nine independent variables and the dependent variable (judged defectiveness). The multiple *R*—in this case, .80—accounted for 69 percent of the variability of judged speech defectiveness. A second multiple *R* was composed for the three variables, repeating /mʌ/, /dʌ/, and /gʌ/. This correlation, .76, accounted for 58 percent of the variability of the dependent variable.

Comment: Results of this study do not support those authors who advocate the use of nonspeech movement of the articulators to evaluate or treat significant restriction of articulatory motility. The results would suggest further that diagnostic and remedial speech work with cerebral palsied children may be accomplished best with the use of speech activities of the articulators. Therefore, it would seem desirable that the speech clinician employ techniques which involve direct speech production on the part of the child rather than the use of nonspeech movements.

Shelton, R. L., Jr., Brooks, Alta R., and Youngstrom, K. A. Articulation and Patterns of Palatopharyngeal Closure. *Journal of Speech and Hearing Disorders*, 1964, *29*, 390-408.

Purpose: To identify, describe, and categorize the patterns of palatopharyngeal closure used by subjects in several utterances; to relate percentage of correct articulation response to a measure of palatopharyngeal closure; and to record for these subjects the frequency of occurrence of Passavant's ridge, a prominent bulge of tissue formed on the posterior wall of the pharynx that sometimes contributes to palatopharyngeal closure.

Subjects: Ten normal speakers, seven persons diagnosed as having palatal inadequacies, and 24 persons with cleft palate that had been surgically repaired by procedures other than pharyngeal flap.

Procedure: Articulation was measured as the percentage of correct responses to an imitative word test. Cinefluorographic films of each subject were made during a series of utterances that included phonemes isolated from context, syllables, and sentences. Palatopharyngeal closure was determined by measuring the minimum distance between the soft palate and the posterior wall of the pharynx. The occurrence of Passavant's ridge was recorded from observation of the X ray film.

Results: Six patterns of pharyngeal closure were recorded: (a) closure completed before the first phonation and maintained until phonation was stopped, except for breaks associated with nasal consonants and adjacent vowels or with long pauses in phonation; (b) usually closed during the course of phonation but with more breaks from closure than in the first category; (c) sometimes closed during the course of phonation; (d) palate movement within three millimeters of closure; (e) palate movement but no approximation of closure; and (f) no palate movement reflected in the measure. A correlation of .52 was obtained between the articulation and mean palatopharyngeal gap measures. The plot of the relationship between these variables for the nonnormal subjects was found to be nonlinear. Three subjects produced a Passavant's ridge. In all three, the ridge was formed during each phonation; however, it contributed to palatopharyngeal closure in only two subjects. The ridge was below the level of the elevated soft palate in the third subject.

Comment: The authors concluded that palatopharyngeal gaps smaller than 2.0 mm, as well as larger gaps, may have an adverse effect on articulation. This suggests that persons whose palates miss contact with the posterior pharyngeal wall by only a small amount, and even persons who achieve palatopharyngeal closure in some contexts may require surgical or prosthetic help with closure if maximum articulation is to be developed. The authors suggested that studies be done to determine the effect of speech therapy on pattern of palatopharyngeal closure.

Wilson, F. B. Efficacy of Speech Therapy with Educable Mentally Retarded Children. *Journal of Speech and Hearing Research*, 1966, *9*, 423-433.

Purpose: To gather descriptive information regarding the articulation performances of several mentally retarded subjects and to determine the efficacy of providing speech therapy to those retardates who possess articulation deviations.

Subjects: Seven hundred seventy-seven children, ages 6 to 16 years, drawn from 90 classes for the educable mentally retarded. None of the subjects had hearing disabilities or severe organic problems.

Procedure: Subjects were first classified as having normal or deviant speech, according to results of the Hejna Articulation Test. A scale of articulatory severity was applied to the speech deviant group. They were then randomly assigned to three groups: experimental, placebo, and control. The experimental group received two half-hour sessions of direct speech therapy per week, within the framework suggested by Van Riper (1963). Children in the placebo group received two half-hour sessions of nonphoneme oriented speech and language stimulation per week, while the controls received no therapy. The Hejna Articulation Test was administered to each child once a year over a three year period. Responses were recorded and later dubbed onto a master tape in random sequential order. The taped responses were then judged and evaluated for type and number of errors.

Results: The results of the descriptive aspect of the study revealed that of the 777 children tested, 53.4 percent had speech deviations while 46.6 percent had normal speech. The articulation of the lower MA subjects was most frequently characterized by omissions; the errors of the higher MA group were of the distortion variety. All three groups showed improvement, but there was no significant difference between groups in amount of improvement.

Comment: The present study demonstrated that: (a) there was a high incidence of articulatory deviation within the sample; (b) the type of articulation defect was closely related to MA; and (c) the application of direct articulation therapy had no significant effect.

Sommers, R. K., Schaeffer, M. H., Leiss, R. H., Gerber, A. J., Gray, M. A., Fundrella, D., Olson, J. K., and Tompkins, E. R. The Effectiveness of Group and Individual Therapy. *Journal of Speech and Hearing Research,* 1966, *9,* 219-226.

Purpose: To determine the relative effectiveness of individual and group articulation therapy and to relate this finding to the additional factor of the severity of articulatory defectiveness.

Subjects: Two hundred forty second, fourth, and sixth graders from a suburban middle class socioeconomic environment, with 80 subjects drawn from each of the three grade levels. The subjects were assigned to 12 experimental groups; half of each group received individual therapy and half received group therapy.

Procedure: One hundred twenty subjects received one 30 minute period of individual articulation therapy weekly. A like number of subjects, randomly selected, received one weekly 45 minute period of group articulation therapy. The mean number of children in each group was 4.5. All therapy was administered by 17 speech clinicians, each of whom provided therapy to some subjects in both experimental groups. A version of McDonald's deep test of articulation was administered on a pre- and postbasis to all subjects. The experimental period was eight and one half months in duration.

Results: A three-way analysis of variance of articulation difference scores was performed. The results indicated that both individual and group therapy were equally effective, independent of either the grade level or the degree of articulatory defect. It was found that subjects with moderate degrees of speech defectiveness improved more than those having mild problems during the experimental period.

Comment: This study was designed to provide some initial evidence concerning the relative effectiveness of individual and group therapy for subjects from different grade levels having different degrees of speech defectiveness. The question of which children to schedule individually and which to schedule in groups has proven to be one of major concern for many speech clinicians working in school settings. The results tend to support the contention of some that, for many children, group therapy can be just as effective as individual therapy.

Winitz, H., and Bellerose, Betty. Effects of Pretraining on Sound Discrimination Learning. *Journal of Speech and Hearing Research,* 1963, *6,* 171-180.

Purpose: To assess discrimination learning of primary age youngsters as a function of several pretraining conditions and to direct attention to two questions: (a) Will sound discrimination learning be facilitated following the correct learning of a phonemic stimulus? or (b) Will sound discrimination be impaired following the incorrect learning of a phonemic stimulus?

Subjects: Two hundred first and second grade children showing no evidence of hearing or learning deficits and who were drawn from above average socioeconomic families. The subjects were assigned to one of five pretraining groups.

Procedure: Pretraining consisted of the presentation of the syllables /vrou/, /brou/, /trou/, and /drou/. Depending upon the procedures of a particular experimental or control group, the children were either instructed to imitate one of the above syllables or to substitute one of the alternate syllables, following a recorded presentation of a syllable. Immediately following the pretraining condition, all subjects participated in a sound discrimination learning task that involved a successive discrimination of /vrou/ and /brou/.

Results: The general results of this investigation indicate that for first and second grade children (a) constant pretraining will facilitate subsequent discrimination learning and (b) sound discrimination learning may be impaired following conditions which provide for the incorrect learning of a phonemic stimulus.

Comment: The findings of this research from a developmental viewpoint might suggest that discrimination abilities are related to other linguistic variables such as vocabulary level or frequency of sounds or words. Further research is required, however, before it can be stated whether a direct relationship exists among these variables, or whether each component of the language process is subject to different controlling stimuli and/or environmental consequences.

McLean, J. E. Shifting Stimulus Control of Articulation Responses by Operant Techniques. Unpublished doctoral dissertation, University of Kansas, 1965.

Purpose: To investigate the dynamics of the modification of defective articulation responses by applying principles and techniques of operant conditioning.

Subjects: Five high level mentally retarded males selected from a population of speech defective residents of a state hospital and training center. The subjects showed articulation errors of a substitution type and some ability to articulate at least one of their defective phonemes correctly when the phonemes were in the initial position of words or when they were in isolation when responses were evoked by auditory visual stimulus models. None of the subjects corrected articulated his defective phoneme in words when responses were evoked by other stimuli such as pictures, printed words, and/or verbal chains which had been designed to evoke the word by association.

Procedure: Each subject was given a training program on ten words that began with a phoneme that he habitually misarticulated but that he showed some ability to correctly articulate when responses were evoked by auditory-visual stimulus models. Correct articulation responses emitted under auditory-visual stimulus conditions were positively reinforced. When a predetermined level of correct responding was attained, an attempt was made to shift the correct response to the control of stimuli which had not previously evoked the correct response. The shifting was accomplished through a process of pairing the evoking stimulus with a previously nonevoking stimulus, reinforcing correct responses to the paired stimulus conditions, terminating the initially controlling stimulus, and then reinforcing correct responses evoked by the remaining new stimulus type. Through this procedure, correct responses initially emitted only in the auditory visual stimulus conditions were to be shifted to the control of pictures, graphemes, and verbal chains.

Results: Four of the five subjects attained high levels of correct articulation when responding under the auditory visual stimulus condition, and the correct responses were successfully shifted to all other stimulus types. Posttraining tests showed that high levels of correct responding were still evoked by auditory, visual, picture, grapheme, and verbal chain stimuli one week after training. Posttraining tests also showed that the newly trained responses tended to generalize to new word items in which the new phoneme occurred in the same position in which it had been trained (initial) but did not generalize to new words when the phoneme occurred in a position other than that in which it had been trained. Posttraining tests also indicated that the new responses tended to overgeneralize to words which, when correctly produced, required the phoneme used as a substitute for the trained phoneme prior to the training program.

Comment: This study investigated the dynamics of the stimulus method of articulation therapy by utilizing the principles and techniques of operant conditioning. The investigation seeks to demonstrate that these principles can provide an effective system for the experimental analysis and the subsequent modification of articulation behavior.

In Review

Several significant factors have emerged from the investigations reported in this section, pointing toward a definite need for more individualized and functionally oriented means of assessing and modifying articulatory disorders. First, those with articulation disorders should not be treated as a homogeneous group but should be evaluated and treated as to type and consistency of misarticulation. Perhaps some of the discouraging reports concerned with the effects of therapy have arisen from the fact that the same training programs have been utilized with all children regardless of what form of misarticulation they display. Second, articulatory defects are probably associated with a coexistence of biological or environmental factors and are not the result of a unitary anomaly. Third, training should be based on functional speech sounds rather than nonspeech movements. Since evidence seems to exist that the many components of the linguistic process are controlled by different environmental stimuli, it is probably more expeditious to train actual sounds than nonfunctional utterances.

This need for more subject oriented research and therapy has been recently expressed by Jerger (1964), who emphasized the values of precisely controlled observation and the search for meaningful functional relationships, in contrast to formal theory construction and statistical inference about averages that tend to disguise much individual data.

FLUENCY DISORDERS

Although the literature on fluency disorders generally centers only on stuttered speech, fluency itself is a broad communication category that includes rate and variability of speech utterances. However, since the research concerned with rate and variability is limited, the studies in this review will for the most part be confined to stuttered speech.

There has been little agreement as to a functional definition of stuttering. Van Riper (1963) has described it as a condition characterized by blockings, prolongations, or repetitions, while Johnson (1956) termed stuttering an anticipatory, apprehensive, hypertonic avoidance reaction. More recently, Luper and Mulder (1964) have offered a four phase classification system to describe the developmental phases of stuttering: incipient, transitional, confirmed, and advanced.

The following selected investigations on fluency appear in two categories: situational effects on fluency and modification of rate of fluent speech. The situational studies reviewed here represent current efforts to manipulate several environmental variables in attempts to discover their effects on fluency. The studies selected to demonstrate the modification of fluent or nonfluent speech have been drawn from an operant framework.

Lerman, J. W., and Shames, G. H. The Effect of Situational Difficulty on Stuttering. *Journal of Speech and Hearing Research,* 1965, *8,* 271-280.

Purpose: To determine (a) the effects of the anticipation of four speaking situations on a stutterer's level of anxiety; (b) whether there is a relationship between this variation in anxiety level and the amount of stuttering in an interview; (c) whether there is a relationship between variation in anxiety level and the number of words in an interview; and (d) the effects of situational participation on subsequent anxiety levels in language content.

Subjects: Twenty diagnosed stutterers ranging in CA from 16 to 52 with a mean of 27.2, participating on a volunteer basis.

Procedure: Four speaking situations varying in difficulty were used. The subjects were interviewed concerning their feelings and anticipations about entering into several different speaking situations. Various measures were derived from each subject's interviews; the measures were a Discomfort Relief Quotient (DRQ), frequency of stuttering, and the number of words spoken by the stutterer.

Results:

1. There was very little difference in the Discomfort Relief Quotients derived from the interviews about three of the four speech situations. The DRQ for the least difficult situation was significantly lower than the DRQ's of the three more difficult situations.
2. The frequency of stuttering in an interview and the degree of anxiety, as measured by the DRQ, were not correlated.
3. No significant relationship was present between the number of words a stutterer used in verbalizing his anticipation of a situation and the level of anxiety as measured by the DRQ.
4. Situational participation did not significantly affect subsequent DRQ's.

Comment: The authors felt that anxiety may have both overt and covert properties but that the nature of the relationship between them is poorly understood. It is not known whether different modes of expressing anxiety work in concert serve to trigger one another in some temporal or sequential pattern, or compete with one another.

It has been hypothesized that a peak of anxiety occurs before and during a moment of stuttering and a reduction in anxiety follows stuttering. The effect of this on language content would be an interesting topic for further research.

Wingate, M. E. Prosody in Stuttering Adaptation. *Journal of Speech and Hearing Research,* 1966, *9,* 550-556.

Purpose: To test the hypothesis that alteration of only the pattern of expression of a passage would diminish the adaptation (repeated reading of the same passage) effect.

Subjects: Sixteen young adult male stutterers.

Procedure: Each subject's record of stuttering was obtained as he read a 207 word passage five times in succession, under two conditions. Under one condition, the passage was exactly the same in all five readings; under the second condition, the same passage was punctuated in five different ways, thus requiring an altered pattern of expression in each reading.

Results: The mean frequency of stuttering was the same for both conditions during the first two readings. However, in subsequent readings the amount of stuttering during the different version condition was significantly higher than during the same passage condition.

Comment: On the basis of previous studies of the adaptation effect, the author believed this phenomenon to involve two factors: a general psychophysiological adaptation and a motor linguistic factor. The findings of this study seem to support the author's belief that a vocal defect in stuttering lies in the difficulty of making quick shifts in the highly integrated coordination of phonation and articulation demanded by the complex function of verbal expression. Eisenson (1958) has similarly stated that stuttering increases as the speaker modifies his linguistic set to changing speech situations.

Soderberg, G. A. The Relations of Stuttering to Word Length and Word Frequency. *Journal of Speech and Hearing Research,* 1966, *9,* 584-589.

Purpose: To investigate the independent effects of word length and word frequency upon the frequency of stuttering.

Subjects: Twenty stutterers, 17 males and 3 females, ranging in CA from 12 to 44.

Procedure: Each subject read nine 10-word lists in the presence of a single listener. The word lists were composed of combinations of three levels of word length and three levels of word frequency. An attempt was made to equate the word lists for stress of initial syllables, grammatical function, and initial sounds of words. The sessions were taped and scored by four judges.

Results: Both word length and word frequency were significant but noninteracting factors in affecting frequency of stuttering. Length, however, was a more potent factor than frequency.

Comment: The author speculated that stutterers may experience more difficulty on longer words because the more complex visual configuration makes them more vulnerable to mispronunciation. It was recommended that assessment designs be constructed that preserve the independence of word length and word frequency for precise measurement of the effects of these variables on stuttering.

Siegel, G. M., and Haugen, D. Audience Size and Variations in Stuttering Behavior. *Journal of Speech and Hearing Research,* 1964, 7, 381-388.

Purpose: To investigate the effects of variations in audience size on stuttering frequency and adaptation of stuttering.

Subjects: Twenty-five stutterers, 20 males and 5 females, ranging in CA from 18 to 62.

Procedure: Each subject was assigned to either an increasing or a decreasing audience size treatment group. Subjects in both groups read orally in an experimental and control condition. The control condition, which was identical for both groups, involved reading a passage five times to a constant audience of one listener. In the increasing condition, the subjects read a passage five times to an audience that started with one listener and increased by one with each additional reading; in the decreasing condition, the situation was reversed. All sessions were taped, and the frequency of stutterings was computed.

Results: Subjects in the increasing group gave evidence of some adaptation in both the control and experimental conditions, with significantly greater adaptation in the control condition. However, the control and experimental conditions for the decreasing treatment did not differ significantly. When the experimental conditions of both treatments were compared, subjects in the decreasing treatment demonstrated greater adaptation.

Comment: The findings of this study suggest that when a stutterer is asked to read the same material to a constantly increasing audience, his performance is affected by two competing sources of influence. The effects of repetitive reading tend to depress the stuttering rate, while the audience factors tend to increase the stuttering rate. The findings concerning the effects of reading to a diminishing audience are equivocal in that it would be assumed that the combination of decreasing audience plus repeated reading would drastically reduce stuttering frequency. However, the fact that the subjects in the decreasing group were considerably less severe stutterers from the outset than those in the increasing group may have confounded the authors' findings.

Siegel, G. M., and Martin, R. R. Verbal Punishment of Disfluencies in Normal Speakers. *Journal of Speech and Hearing Research,* 1965, *8,* 245-251.

Purpose: In a previous experiment by these investigators (Siegel and Martin, 1965) it was found that contingent electric shock reduced the dysfluencies of normal college adults, while random presentation of shock had no significant effect. In the current experiment, the verbal stimulus "wrong" was substituted for the shock to determine whether similar modification of dysfluencies would be accomplished with a verbal "punisher."

Subjects: Twenty high and 20 low dysfluency level normal college students. Half of each group was assigned to the two experimental conditions, contingent and random verbal punishment.

Procedure: Each subject participated in a 36 minute reading session, which was divided into 12 minute baseline, treatment, and recovery segments. During the baseline and recovery segments no stimuli were delivered, but the experimenter counted dysfluencies, defined as repetitions or interjections of words, syllables, sounds, etc. In the treatment segment the contingent group subjects were presented the word "wrong" immediately after each dysfluency, while the random group subjects heard "wrong" on a predetermined random schedule.

Results: The results parallel those of a previous experiment in which electric shock served as the punishment. Random presentation of the stimulus had no significant influence on dysfluency, while contingent presentation resulted in a sharp drop of dysfluencies for nearly all subjects. Removal of the "wrong" was followed by an increase in dysfluencies to approximately baseline levels.

Comment: These results indicate that adult dysfluencies constitute a discriminable class of verbal behaviors, and that they may be modified by conditioning procedures. In contrast to previous experiments, shock or "wrong" results in lowered dysfluency rates. The discrepancy in results with other experiments may be attributed, at least in part, to the fact that in previous research an explicit contingency between the dysfluent response and the subsequent "punishment" was not established. Additional research is needed to explore the range of variables that may serve as punishers of dysfluencies in this sort of situation, as well as the kinds of subjects to whom these results may be generalized.

Salzinger, Suzanne, Salzinger, K., Portnoy, Stephanie, Eckman, Judith, Bacon, Pauline M., Deutsch, M., and Zubin, J. Operant Conditioning of Continuous Speech in Young Children. *Child Development,* 1962, *33,* 683-695.

Purpose: To test the applicability of the general theoretical framework of behavior theory to continuous speech in five to seven year old children.

Subjects: Forty-five nursery school and first grade children, each of whom took part in one or two of the five experiments described within the study.

Procedure: Five experiments were performed, each one employing a different response reinforcement contingency. The first concerned the general problem of whether speech rate could be modified by reinforcement, the second tested the effect of a variable ratio schedule on speech rate, the third tested the effect of a fixed interval schedule, the fourth examined the effects of reinforcement on a preselected specific response class, and the fifth was performed as a control, using no reinforcement. The reinforcing apparatus was a paper maché clown's head with a red light bulb for a nose. The children were instructed to talk to the clown to make him happy and thereby get his nose to light up. Taped instructions were given "from the clown," and the children's speech was recorded.

Results: Speech rate was found to increase as a result of the administration of reinforcement and was found to decrease or stabilize when reinforcement was withheld. Both the schedule and the number of reinforcements delivered appeared to produce differences in response strength during extinction. Reinforcements were not effective unless more than 10 were administered. The application of reinforcement to the response class of first person pronouns produced an increase not only in the specific class itself but also in general speech rate. A control group of children who were given no reinforcement showed no systematic changes in speech rate other than extinction effect with time.

Comment: This study of verbal behavior in children, originating within the framework of operant conditioning, shows that the emission of verbal responses can be experimentally controlled by means of reinforcement. Treating speech as behavior in and of itself, and not as a symbolic representation of underlying meaning, has demonstrated lawful relationships which are specified by the general theoretical framework of behavior theory.

Martin, R. R., and Siegel, G. M. The Effects of Simultaneously Punishing Stuttering and Rewarding Fluency. *Journal of Speech and Hearing Research*, 1966, *9*, 466-475.

Purpose: To determine if stuttering frequency could be reduced through the use of response contingent verbal punishment as well as procedures designed to overcome traditional objections to the use of punishment.

Subjects: Two adult male stutterers, ages 19 and 21.

Procedure: The subjects read orally a prepared passage for eight sessions during which stuttering frequency was recorded. A base rate was determined during the first session. During session two the examiner said, "not good," contingent upon each instance of stuttering, and "good," contingent upon 30 seconds of fluency. Sessions three and four followed the same procedure, except that a strap was attached to the subject's wrist during the time the verbal stimuli were delivered. In session five the subject was instructed to speak fluently, but the strap was not attached and no verbal stimuli were delivered. During session six the strap alone was presented. In session seven the strap was attached while the subject read to an audience. During session eight the strap was attached while the subject read into a telephone.

Results: A decrease in stuttering frequency was observed when the contingencies were "not good" for stuttering and "good" for fluent periods. Removal of the verbal stimuli was followed by an increase in stuttering frequency to near base rate level. The wrist strap served as an effective discriminative stimulus in that, after being paired with the verbal stimuli for a period of time, attachment of the strap alone was sufficient to reduce stuttering frequency. The strap also served a discriminative function during the time the subjects read to an audience and into a telephone.

Comment: The results of this study along with others of the past few years warrant additional work toward the analysis and modification of stuttering behaviors through operant techniques. The extent to which the strap used in this study served as a discriminative stimulus that decelerated stuttering is particularly relevant to stuttering therapy. It could suggest that after stuttering is modified in a clinic situation, it may be possible to achieve carryover in other situations through the use of a carefully programed discriminative stimulus.

In Review

These reports deal with a variety of situational effects on fluency and the modification of fluent or nonfluent speech. The former studies that offered a variety of environmental variables such as word lengths or audience size and assessed their effects on fluency demonstrated that generally the addition of these variables affected the fluency of speech.

In regard to altering stuttering frequency and rate of speech by operant techniques, two rather important emphases in research seem to be neglected. First, studies that demonstrate the effectiveness of modification procedures with children are desperately needed. Although the fluency of adult speakers has been altered by some training procedures, few if any studies are to be found that have successfully modified dysfluent speech in children. Second, it would seem to be of great educational relevance to analyze functionally the child's stuttering behavior in a number of actual environmental settings. The majority of the studies on stuttering have required individuals to read from a prepared text and then count the number of dysfluencies. It is probable that much of the data obtained in this manner is not synonymous with a subject's communicative efficiency in actual noncontrived situations.

Phonation

Traditionally, problems of phonation or voice have been categorized as relating to pitch, intensity, or quality. Another classification scheme that has been used is organic versus functional. For purposes of presenting this review, the studies are grouped under two headings: those that relate to voice production (laryngeal and alaryngeal) and those that relate to resonator modification.

Although a very small percentage of referrals to public school speech clinicians relate to problems of phonation, early recognition and treatment of these cases is most important. The school person performs the greatest service in recognizing problems of phonation and in referring such children to the speech clinician.

Clinical concern and research interest have been stimulated by the recent increase in laryngectomies resulting from laryngeal carcinoma. In 1955 (Diedrich and Youngstrom, 1966) the American Cancer Society estimated that there were 25,000 laryngectomized persons in the United States and that from 2,500 to 4,000 new patients would be added each year. The current concern is largely centered on the need to develop and maintain oral communication skills for these patients.

The two alaryngeal studies selected for this review are concerned with two important dimensions of the problem in training these laryngectomized subjects to speak. The first deals with the issue of the intelligibility of speech of laryngectomized individuals using esophageal speech and those employing an artificial larynx. The second study attempts to validate clinical measures used to assess progress in acquiring esophageal speech.

Arnold, G. E. Vocal Nodules and Polyps: Laryngeal Tissue Reaction to Habitual Hyperkinetic Dysphonia. *Journal of Speech and Hearing Disorders,* 1962, 27, 205-217.

Purpose: To present current knowledge on the causes, types, and pathological forms of this laryngeal lesion.

Subjects: Personal observations during some twenty-five years are compared with the pertinent studies in the literature. In one particular study cited, 169 cases were analyzed.

Procedure: The present concepts of etiology, symptomatology, pathology, histology, therapy, and prognosis are reviewed in narrative form. Thirty-five representative references are cited.

Results: Vocal nodules are benign growths at the median margin of both vocal cords. Polyps represent a more advanced stage of the same disease. Functionally seen, the nodes appear at the point of greatest amplitude of vocal cord vibration—that is, in the midline between anterior commissure and vocal process. Nodules seem always to result from faulty or excessive vocal function. They are, according to Arnold, a secondary organic sign of a primary disorder of psychosomatic or socioeconomic origin that may represent a local tissue reaction to the mental strain imposed by inappropriate emotional adjustment to the demands made by society. Treatment by surgery and vocal rehabilitation is discussed.

Comment: The study attempts to answer the persistent question posed by speech therapists: What should be done in the individual case? The answer is a plea for close collaboration between the diagnosing or surgical laryngologist and the speech pathologist in charge of rehabilitation. Prognosis is good when meaningful collaboration between the two specialists can be established.

Wilson, D. K. Children with Vocal Nodules. *Journal of Speech and Hearing Disorders,* 1961, *26,* 19-26.

Diagnosis: Children with vocal nodules require special consideration in diagnosis and treatment. A laryngeal examination is essential and medical clearance is necessary before initiating voice training. A complete physical examination, intelligence testing, and personality evaluation are desirable for a complete diagnosis. The speech and hearing diagnosis includes detailed interviews with the parents, routine peripheral speech mechanism examination, an articulation test, audiometric testing, and a complete voice analysis. This analysis should consist of careful assessment of the habitual pitch level, range, and flexibility; an evaluation of the loudness of the voice in respect to appropriateness to the situation and the child's control over it; and a study of hoarseness, including rating on a three point scale. The program ordinarily recommended for children with vocal nodules is to use vocal reeducation as the first step, with surgery being done only when it is evident that reduction of the nodules cannot be effected by vocal retraining.

Reeducation: Voice rehabilitation includes: (a) eliminating vocal abuse, (b) making any indicated changes in pitch usage, (c) teaching the child to control his speech intensity, (d) improving the hoarse voice quality, and (e) habituating the new patterns. Representative training and motivating devices are described for use in handling each of these five aspects of retraining. Carryover, or habituating the new voice patterns, is particularly difficult in young children with vocal nodules, and requires the cooperation of parents, teachers, and others interested in helping the child.

Prognosis: A significant reduction in the size of the nodules and an accompanying improvement in the voice quality can be expected within three to six months.

Followup: A systematic followup program over a period of several years is sometimes desirable in order to keep a check on vocal abuse and to assure continuation of good vocal habits.

Dickson, D. R. An Acoustic Study of Nasality. *Journal of Speech and Hearing Research,* 1962, *5,* 103-111.

Purpose: To delineate spectrographic correlates of functional nasality and cleft palate nasality and to investigate possible differences between these two clinical groups.

Subjects: Twenty normal speakers, 20 speakers classified as having functional nasality, and 20 speakers with cleft palate and nasality. All subjects were adult males.

Procedure: The vowels /i/ and /u/ in the words "beet" and "boot" were recorded for each subject at a constant intensity in a sound treated room. Each vowel was rated on a seven point scale of nasality by five experienced phoneticians. The vowels were then analyzed spectrographically to provide a frequency by time and frequency by intensity analysis.

Results: Three basic factors were felt to be inconsistently related to the nasal vowel spectra. These were loss of power, increased damping, and the addition of resonances and antiresonances. The inconsistency of the appearance of these factors from subject to subject was felt to be related to differences in the physical properties of the subjects' resonating systems. No means were found to differentiate nasality in cleft palate and noncleft palate individuals.

Comment: The present study tended to support previous research in this area but emphasized individual differences in the acoustic characteristics of nasality. The hypothesis that the degree of perceived nasality depends upon the number of spectrum characteristics related to increased damping and the addition of resonances and antiresonances seems plausible when consideration is given to the variation expected in the physical properties of the nasal and vocal tracts from subject to subject.

McCroskey, R. L., and Mulligan, Marigene. The Relative Intelligibility of Esophageal Speech and Artificial-Larynx Speech. *Journal of Speech and Hearing Disorders,* 1963, *23,* 37-41.

Purpose: To study the intelligibility of two methods of producing speech by laryngectomees—esophageal speech and artificial larynx, as determined by both sophisticated and naive listeners.

Subjects: Ten laryngectomized individuals, five of whom used esophageal speech and five of whom employed an artificial larynx. The mean number of years of experience for users of the artificial larynx was 13.8, and for the esophageal speakers was 6.1. All subjects had employed their own method for one year or longer.

Procedure: Each speaker read different multiple choice intelligibility lists composed of nine groups of three words each. These speech samples were recorded and played to three panels of 10 listeners each. The listeners received forms with four alternatives for each stimulus word, and they responded by crossing out the word they heard. The use of three panels allowed for an analysis of intelligibility as affected by listener groups (experienced speech therapists, graduate students with some prior exposure to speech of the laryngectomee, and naive listeners).

Results: Speech pathologists and graduate students in speech therapy judged the esophageal speaker as more intelligible, while the naive listeners favored the artificial larynx speaker.

Comment: It is demonstrated again that intelligibility is a joint function of a speaker and auditor. The authors suggest that intelligibility scores may be influenced by professional preferences and training. They caution that bias against mechanical speech is not supported by intelligibility data and may seriously penalize those laryngectomees who cannot otherwise achieve functional communicative skill.

Berlin, C. I. Clinical Measurement of Esophageal Speech: I. Methodology and Curves of Skill Acquisition. *Journal of Speech and Hearing Disorders,* 1963, *28,* 42-51.

Purpose: To assess clinically four dimensions of esophageal speech: (a) ability to phonate reliably on demand, (b) latency between inflation of the esophagus and vocalization, (c) duration of phonation, and (d) ability to sustain phonation during articulation.

Subjects: Thirty-eight male laryngectomees who were divided into "good speaker" (28) and "poor speaker" (10) groups.

Procedure: The subject was asked to make a single inflation and to follow it by the phonation of [a]. To be considered successful, a vocalization had to last for .4 second or longer. To measure latency, the subject was asked to phonate as quickly as possible after an inflation. The same .4 second criterion was maintained for successful phonation. To assess duration of phonation, the subject was asked to phonate a single vowel [a] and to sustain it for as long as possible. To measure each subject's ability to sustain phonation during articulation, the subject was asked to use only one inflation in repeating [da] as many times as he could without consciously reinflating.

Results: It was noted that all of the good speakers were able to phonate on demand in 14 days. Sixty-eight percent of the poor speakers successfully phonated in an equal amount of time. As to latency, the good speakers by the twentieth day showed a mean latency of .24 second, while the poor speakers had a mean latency of 1.3 seconds. As to duration, the good speakers presented a mean duration of 2.8 seconds, the poor speakers a mean duration of 1.3 seconds. In the final skill, the repetition of [da], the good speakers produced a mean of 8.6 syllables and the poor speakers, a mean of 2.3 syllables.

Comment: The usefulness of these four measures of esophageal speech in a therapeutic setting has great relevance in that the mastery of esophageal speech is often a slow process and many subjects as well as therapists become discouraged. These measures can demonstrate graphically to subject and therapist the gradual gains of speech training.

In Review

The inclusion of five abstracts representing research in this area certainly does not reflect the depth and breadth of investigation of phonation problems. However, it is felt that from this selection the reader gains a further awareness and understanding of: (a) the development of, effects of, and therapeutic treatment for vocal nodules; (b) the problem of nasality that exists with and without cleft palate residual; and (c) the problems of developing alaryngeal speech.

According to Diedrich and Youngstrom (1966) several issues in the field of alaryngeal rehabilitation have been resolved—for example, synchrony versus asynchrony of breathing and speech, and inhalation versus injection as a method of air intake. Some controversy continues, however, as to the most effective communication process for the laryngectomized patient, whether he uses esophageal or mechanical speech. Since research evidence has shown that both methods of breathing and both forms of air consumption are employed by many subjects, an either/or hypothesis as to these procedures has been rejected. Diedrich and Youngstrom have recommended that the controversy over the most effective communication process, esophageal versus mechanical, be similarly abandoned. They have suggested compatible uses of the two tactics by recommending mechanical speech for some, esophageal for others, and a combination for still others.

In either case, whether the patient is taught speech by the esophageal or the mechanical method, certain measurable aspects of therapeutic progress must be provided. This is particularly apparent when the esophageal method is employed. Since it has been clinically noted that the progress of the laryngectomized patient in acquiring esophageal speech is sometimes extremely slow and tedious, methods to indicate their progress graphically are essential. By providing to the subject and clinician objective evidence of the patient's progress during therapy, based on measures such as those recommended by Berlin, therapists should be able to involve more esophageal speakers in training situations for longer periods of time.

Language

When one talks of communication problems in the broadest sense, impairment of language function is often inferred. Carroll (1967) defined language as "a structured system of arbitrary vocal sounds and sequences of sounds which is used or can be used in interpersonal communication by an aggregation of human beings and which rather exhaustively catalogues things, events, and processes in the human environment [p. 43]."

Traditionally in this area the problems of delayed speech or language, aphasia, and speech of the mentally retarded have been discussed. The emphasis has been on far more than oral speech and its phonemic or phonatory aspects. The problems here are more concerned with morphology (word units), syntax (relationships of words to other words), and semantics (the meanings that accrue to words or symbols).

For many years, research findings gave little direction to programs for those children considered language delayed or mentally retarded. In fact, few mentally retarded children at any intellectual or chronological level received the benefits of the clinical speech program. The following studies do a great deal not only to inform but also to encourage those who would advocate more inclusive as well as more extensive training in these areas of deficit.

Menyuk, Paula. Comparison of Grammar of Children with Functionally Deviant and Normal Speech. *Journal of Speech and Hearing Research*, 1964, 7, 109-121.

Purpose: To use a generative model of grammar to describe and compare the syntactic structures used by children with deviant and normal speech in an attempt to obtain an adequate and formal description of the deviant speech, previously intuitively labeled as infantile.

Subjects: Ten children who were diagnosed as using infantile speech, with no evidence of any physiological impairment as the cause for the speech disorder, matched on the basis of age, sex, IQ, and socioeconomic status with 10 children using normal speech. The age range of the groups was 3-0 to 5-10. Language was also obtained from one child over a 12 month period from age 2-0 to 3-0 to examine the possibility that children with infantile speech were using syntactic structures which were similar, in fact, to those used by a much younger child.

Procedure: Language was elicited and tape recorded in various stimulus situations. The language sample produced by each child was analyzed using a generative model of grammar, and the syntactic structures used were described. (For details on obtaining and analyzing language samples, see Menyuk, 1963.) A smaller sample of the children in each group was asked to repeat a list of sentences containing various transformational structures (other than the simple active declarative type) and sentences containing restricted forms (sentences which deviate from traditional grammatic structure). Statistical comparisons were made between groups on the use of various syntactic structures and of repetition and modification of various sentence types.

Results: Three factors emerged from this comparison. First, the term infantile seems to be a misnomer. At no age level did the grammatical production of a child with deviant speech match or closely match the grammatical production of a child with normal speech from age of two years on. Second, formal differences could be described in the syntactic structures used by the two groups. The children with normal speech were using increasingly more differentiated and structurally complex syntactic rules as an increasingly mature population was observed. The children with deviant speech continued to use the simplest and most general rules throughout the age range, which also kept them at the level of continuing to produce certain restricted forms (primarily nongrammatical structures due to omission of rules). Third, in repetition, the children with deviant speech, for the most part, repeated with omissions or simply repeated the last words of sentences. Nonrepetition was significantly correlated with sentence length. The repetition of sentences by children with normal speech was dependent on the structure of the sentence, and for them nonrepetition was not significantly correlated with sentence length.

Comment: By using a generative model of grammar for description, rather than simply applying an intuitive diagnostic label, some formal difference between the grammar of a normal speaking group of children and a deviant speaking group of children could be described. Further, it might be hypothesized from the results that the differences obtained were due to differences between the two groups in their memory span for underlying structure of sentences, thus approaching a more adequate description of the deviant speech.

Sklar, M. Relation of Psychological and Language Test Scores and Autopsy Findings in Aphasia. *Journal of Speech and Hearing Research*, 1963, *6*, 84-90.

Purpose: To determine the relationship between standardized psychometric data, language disturbances, and autopsy protocols of the cerebral cortex in aphasic patients.

Subjects: Forty-four medically diagnosed aphasic patients (median CA of 52.1 years, range 24-67). These patients were administered the Sklar Aphasia scale to determine the objective language disturbances resulting from damage to the cerebral cortex. Of the 44 patients originally tested, 27 were capable of completing a comprehensive psychological test battery. Twelve of the 27 subsequently came to autopsy, making possible a structure function analysis.

Procedure: The psychological tests administered were the Wechsler-Bellevue, Rorschach, Bender Gestalt, Goldstein Scheerer Cube Test, and Sklar Aphasia scale. The scored psychological tests were submitted to experienced staff psychologists who ranked each battery in terms of total test performance, from best to worst. The aphasia test was similarly ranked by a speech pathologist experienced in aphasia. The protocols of the cerebral cortex of the 12 subjects who came to autopsy were ranked independently by three neurologists as to amount of cortical deterioration and its effect on language.

Results: Rank order correlations were calculated and a linear relationship between psychological test scores, language disturbance test scores, and anatomical deterioration of the cerebral cortex was found. The Sklar Aphasia scale emerged as a reliable index of cortical deterioration of aphasic patients when compared to the neurologists' independent ratings. The Wechsler and the Aphasia scale were highly correlated with the amount of damage ($p < .01$), while the Bender damage correlation was significant at the .05 level. The Goldstein Scheerer and the Rorschach tests were not significantly related to severity of cortical deterioration.

Comment: Although the statistical analysis indicated a linear relationship between structural deterioration and functional impairment, the variable patient behavior suggested that both generalized and specific psychological and linguistic performance need to be considered for the individual patient.

Marge, M. The Influence of Selected Home Background Variables on the Development of Oral Communication Skills in Children. *Journal of Speech and Hearing Research,* 1965, *8,* 291-309.

Purpose: To explore the influence of certain home background variables on the development of oral communication skills in preadolescent children.

Subjects: One hundred forty-three 11 year old children, their parents, and their teachers. Data already collected on these children in an earlier study were supplemented for the present study.

Procedure: Three basic testing instruments were developed: the Parent Questionnaire, the Teacher Rating Form, and the Speech Skills Battery. The Parent Questionnaire, administered in groups, sought information about child rearing practices and attitudes. The Teacher Rating Form, also administered in groups, involved observing children's speech and personality characteristics, as well as rating the children on a number of behavior scales. The Speech Skills Battery, which was administered by the experimenter in both individual and group sessions, obtained a number of scores of speech skill, as well as a tape recording of the subject's speech, which was later rated on 40 scales by two speech specialists. The intercorrelation matrix of the 40 speech variables was computed and submitted to an analysis from which seven factors were extracted. Factor scores, to be used as criterion measures of speaking skill, were computed for the three factors considered most pertinent to this study. Intercorrelations of the antecedent variables and the three criterion measures were computed.

Results: It was found that: (a) permissiveness in child rearing practices was not related to the development of general speaking ability in children; (b) parental demands were not highly related to general speaking ability or to the development of language maturity; and (c) higher scores on general speaking ability were related to greater use of speech training techniques in the home. It was noted that there was a large difference between ratings of speech specialists and teachers, suggesting that different definitions or evaluation criteria were used by these groups.

Comment: The study attempted to answer one of the most significant questions relating to child language development: How and to what extent do factors in the home influence speech and language development? A more reliable and valid measure of speaking ability was sought in using factor scores.

Siegel, G. M., and Donovan, K. E. Verbal Behavior of Retarded Children in Interpersonal Assemblies with Adults. *American Journal of Mental Deficiency*, 1964, *69*, 244-252.

Purpose: It had been demonstrated that adults characteristically use more redundant speech patterns when interacting with low (versus high) verbal retarded children. This study was designed to determine whether systematic variations in adult speech patterns would have any effect on the children.

Subjects: Twenty-four institutionalized retarded boys and girls ranging in CA from 8 to 14. Half of the children were designated as high in verbal level and half as low, based on the results of a language test (The Parsons Language Sample).

Procedure: A female adult experimenter was trained to vary the diversity or redundancy of her speech while telling simple stories to children. Diversity and redundancy were defined in terms of a type token ratio (TTR) which was computed as the proportion of different words (types) in a standard sample of 200 words (token). The higher the ratio, the more diversified was the speech. Each child participated in two conditions, one in which his verbal responses to diversified adult stimulation were observed, and a second in which his responses to redundant speech stimulation were noted. Tape recordings of all sessions were transcribed and scored on a number of noncontent measures.

Results: The experimenter was able to vary her TTR in the two conditions, and the children responded with significantly more intelligible words in the redundant condition than in the diversified condition. The children also had a greater, although not significant, mean length of response in the redundant condition. The interaction between levels of the children and the type of stimulation was not significant.

Comment: This study attempts to draw out the implications of an interpersonal analysis of the interaction between retarded children and adults. Given the previous findings that, when assembled with adults, retarded children provide cues that modify the behavior of the adults, it becomes important to determine whether variations in adult behavior in turn affect the children. This study suggests that such variations are related to behavior of retarded children and it also raises numerous questions concerning the interactions between retardates and other members of their environment.

Mueller, M. W., and Dunn, L. M. Peabody Language Development Program with Educable Mentally Retarded Children: After Four and One Half Months. Unpublished Project Report, Peabody College, 1966.

Purpose: To investigate the effectiveness of the Peabody Language Development Kit (PLDK) in improving language abilities of educable mental retardates.

Subjects: A random sample of 283 experimental and 85 control subjects drawn from 583 pupils enrolled in primary and intermediate special classes.

Procedure: Teachers in 27 EMR classes provided language instruction to their pupils for a period of four and one-half months using the PLDK. Evaluation of the effectiveness was made by analysis of pre-posttest differences on four subtests (Auditory Vocal Association, Auditory Vocal Automatic, Visual Motor Sequencing, and Auditory Decoding) of the ITPA.

Results: Experimental subjects demonstrated a mean gain of 4.62 months in language age as opposed to a gain of 2.59 months for the control group ($p < .05$). However, variability within the experimental group was so great that this difference must be interpreted with caution. Post hoc analyses suggested that such variables as teacher proficiency and subject race contribute as much to the effectiveness of the program as does the PLDK itself.

Comment: The results of this investigation suggest that the PLDK may be an effective means of enhancing language development of EMR children when used on a regular basis by the special class teacher. Continuation of this project is directed at determining what subject and situational variables are related to program effectiveness, and the extent to which improved language development generalizes to other behavior.

Yoder, D. E. Audience Control of Children's Vocal Behavior. Unpublished doctoral dissertation, University of Kansas, 1965.

Purpose: To investigate the control of an audience on the vocal behavior of children.

Subjects: Four mentally retarded boys (CA range 8-12, MA range 5-8), randomly selected from the Parsons State Hospital and Training Center.

Procedure: This study, utilizing an operant conditioning paradigm, attempted to show relative changes in vocal behavior of children as a function of a nonvocal reinforcer and punishing stimulus. A filmed video audience, consisting of a prerecorded videotape of a young female who made random smiling and positive head nodding movements, was used. These movements were not contingent upon the responses made by the subjects. The video picture itself was presented or withdrawn when the subjects vocalized, depending upon the experimental contingency. The video sequence was 420 seconds in length and was repeated every session for each subject throughout the experiment. The subjects repeated the individual treatment sessions until they reached the criterion levels established for each of the treatments.

Results: It was demonstrated that:

1. The presentation of a filmed video audience contingent upon vocalization was an effective reinforcer of vocal behavior. Vocal behavior increased upon the presentation of a filmed video audience at or immediately following vocalization.
2. The removal of a filmed video audience contingent upon vocalization was an effective punishing stimulus. Vocal behavior decreased when a filmed video audience was withdrawn immediately following vocalizing.
3. Vocal behavior was low when neither reinforcement nor punishment were received for vocalizing.
4. As vocal behavior increased, nonvocal behavior decreased. The reverse situation also occurred.

Comment: The subjects individually responded to the video audience in different ways, but exhibited behavior which demonstrated its effectiveness in controlling their vocal responses in three different experimental contingencies. It appears that an initial step has been taken in studying the effects of a nonvocal reinforcing audience on the vocal behavior of children. Sufficient evidence has resulted from this study to warrant further investigation using a filmed video audience to probe for other effects on the vocal behavior of children.

Risley, T. R. The Establishment of Verbal Behavior in Deviant Children. Unpublished doctoral dissertation, University of Washington, 1966.

Purpose: To isolate the variables and procedures sufficient for the development of verbal behavior in children who exhibit restricted repertoires of verbal imitation.

Subjects: Four children, ranging in age from three to seven, who encompassed a range of imitative behavior, including accurate though inappropriate imitation of words and phrases, imitation of only some syllables, and imitation of only some phonemes.

Procedure: The children were brought to the laboratory in a state of mild food deprivation and food reinforcers were used to establish verbal imitative behaviors. Any disruptive behaviors—such as crying, moving around the room, or grabbing the food reinforcers—were systematically extinguished. Sitting quietly in the chair and attending to the examiner was reinforced, when necessary, during the early sessions. An extensive investigation was made of the crying behavior of one child. Initially a child was reinforced for verbal imitative responses already in his repertoire. This was continued until these imitative responses occurred with a high probability and short latency after each discriminative stimulus was presented by the examiner. After discriminative control over the child's existing mimicking repertoire had been established, new imitative responses of approximately the same length or difficulty as the already existing responses were shaped. When a sufficient repertoire of imitative responses of a given length had been established, stimulus fading techniques were used to chain these responses together into longer imitative units of words and phrases. These words or phrases were then chained together by the same fading procedures to produce even longer imitative response units. When an imitative word or phrase had been established, it was then brought under the discriminative control of pictures, objects, or questions so that the child used that word correctly. On the assumption that the development or lack of development of normal speech is related to conditions in the home environment, one aspect of the home environment was modified—the skill and probability of the parents' reinforcing approximations to appropriate verbal behavior. The children's parents were trained to employ reinforcement contingencies in formal sessions in the home, and became able to maintain and expand their child's verbal repertoire. During the course of this study, experimental manipulations were made to isolate the effects of the reinforcement variables involved in the procedures.

Results: This program was effective in systematically establishing limited repertoires of normal verbal behavior in all subjects.

Comment: The results of this study indicate (a) that normal verbal behavior can be produced from rudimentary imitative verbal behavior through the application of established principles of behavior, and (b) that, by implication, these principles are involved in the normal development of verbal behavior.

The reader is referred to the studies by Blessing, Smith, and

Mueller and Smith which are reviewed in the chapter on the mentally retarded, pp. 38-109.

In Review

The increased interest and research concerning language problems are evidenced by the quantity and range of studies presented here. The influence of federal funds and accelerated research interest in mental retardation has also had an obvious impact on the general area of language research. In the first review of this type, Schiefelbusch (1963) noted, "Studies in speech and language behavior of retardates have been few in number [p. 285]," and it was also apparent that there was a paucity of experimental studies on language development. Now, the reviewer finds numerous studies representing the products of psychologists, linguists, speech pathologists, and special educators, all of which do a great deal to enhance the understanding of language problems. The research reviewed which illustrates efforts at training does a great deal to support and encourage the further development of specific and general language development programs for children described variously as deprived, retarded, deviant, or language delayed. Particular attention is called to the values of the early introduction of systematic and continuing programs, as well as to the importance of reinforcement principles.

SUMMARY

As one reviews the literature in this field over the past six years, the meaning of "knowledge explosion" takes on more significance. Note must be made of the American Speech and Hearing Association's transition from a single journal to three journals during the last decade. The emergence of the *Journal of Speech and Hearing Research,* now in its eleventh year, staggers the neophyte and challenges the professional in regard to the quantitative and qualitative research reporting. The publication, *ASHA,* now in its tenth year, serves a vital function in reporting current surveys, practices, materials, and special events. The senior publication, *Journal of Speech and Hearing Disorders,* focuses more on clinical research, case studies, remedial procedures, and techniques of evaluation.

Also, it must be noted that with increasing frequency the topics of speech, language, and communication disorders appear in such journals as *Behavior Research and Therapy, Exceptional Children, American Journal of Mental Deficiency, Education and Training of the Mentally Retarded, Training School Bulletin,* and *Child Development,* as well as a wide assortment of other journals. It is obvious that the plan for a frequent survey of research in this area is indicated.

One is impressed with the strides made in research across all areas of communicative disability. Descriptive studies continue to predominate, but the importance and meaningfulness of this type of research can hardly be questioned at this stage of understanding. The increased number of training and modification studies is encouraging, and the pervasive influence of reinforcement theory as translated through research is unmistakable.

The entire field of clinical speech seems to be taking giant strides from an era of intuition and generalization from clinical experiences to a time of incisive questioning and investigation. Important, vital questions appear to have been asked, and trained researchers from a variety of disciplines seem intent on discovering materials, techniques, and approaches to ameliorate communication problems.

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8

Behavioral Disorders

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In the brief time period between the publication of the two volumes in the current series, some overlapping trends are noted which hold promise of considerable change both in the level of understanding and in approaches to children with behavioral disorders. First, there is an increase in the proportion of scholarly papers which reflect evaluation, rather than mere exposition, of various treatment approaches. Second, there is a growth of influence in this field of concepts and techniques from the psychology of learning, especially with regard to various types of intervention. Third, there is a refinement of concepts and definitions *vis-à-vis* behaviorally disordered children away from a speculative psychodynamic tradition and more in keeping with the tenets of scientific empiricism.

In the last volume, an analogous chapter on the "emotionally disturbed child" described such a child as

> one who, because of organic and/or environmental influences, chronically displays: (a) inability to learn at a rate commensurate with his intellectual, sensory-motor and physical development; (b) inability to establish and maintain adequate social relationships; (c) inability to respond appropriately in day to day life situations, and (d) a variety of excessive behavior ranging from hyperactive, impulsive responses to depression and withdrawal. Although there are varying degrees of the above behavioral deviations in emotionally disturbed children, the key to the eventual diagnosis of this condition is the chronicity of these symptoms.

While this definition is still useful, it must be noted that there is a growing acceptance of an ecological viewpoint in the field; for example, there is more general recognition that a common denominator among "emotionally disturbed" children is the fact that they are *disturbing* to others in their milieu. For this and associated reasons, the more neutral and descriptive term "behavior disorders" has been applied more and more frequently to children whose actions are considered deviant.

While there is certainly a substantial trend toward rigor in the evaluation of various intervention approaches, this trend is not yet pervasive. Journals and texts in the field still fairly bulge with sermons and/or poorly controlled case studies; faith and fact are often confused. Consequently, any set of illustrative studies from the current period will necessarily include some examples which are not very sensitive to the trend towards rigor, but none will be included here that are impressionistic or that do not utilize at least rudimentary tenets of measurement.

The present authors formulated a list of categories which they felt reflected the field, but a balanced representation was not found in the current literature. In establishing the list of categories (some of which are by necessity underrepresented) it was felt that several of the more glaring needs for solid future research might be pointed up. Therefore, the following outline was used:

1. Demography
    a. Etiology
    b. Epidemiology
    c. Predictive Studies
2. Correlates
    a. Empirical Behavior Descriptions
    b. Social and Economic Factors
    c. Physical Factors
    d. Personality Factors
    e. Educational Characteristics
3. Interventions
    a. Prevention
    b. Treatment

The articles reviewed sometimes overlap, since in several cases a number of the above areas are covered in a given investigation.

DEMOGRAPHY

Etiology

Investigations reported in this section deal with physical and environmental causation, and with the interaction between constitutional and social factors which results in the genesis of inappropriate or disturbing behavior.

Goldfarb, W. *Childhood Schizophrenia.* Cambridge, Massachusetts: Harvard University Press, 1961.

Purpose: To establish bases for differentiating between presumably schizophrenic and normal children and for differentiating among schizophrenic children, through a wide array of diagnostic approaches and techniques.

Subjects: Twenty-six residents of Ittelson Center, a facility for severely disturbed children, and 26 presumably normal children in the community. The groups were matched on CA and sex.

Procedure: Three broad categories of appraisal were used: physical, behavioral, and family adequacy. About 45 separate procedures and/or tests were involved.

Results: Through neurological assessment, schizophrenic subjects were separated into organic and nonorganic subgroups. There were significant differences between these groups on several other measures. However, a number of tests or procedures which failed to differentiate organics and nonorganics did differentiate schizophrenics as a group from normal children. There were no differences between the groups on measures of physical status. On 93 percent of the behavior appraisals, normals were superior to nonorganics who, in turn, were superior to organics. In contrast, on measures of family adequacy, families of organics were more intact than families of nonorganics. Application of Q technique yielded five factors distinguishing normal and schizophrenic children.

Comment: The findings that schizophrenics as a group differ from normals as a group on many tests and that it is possible to distinguish organic and nonorganic schizophrenic subgroups on many tests do not necessarily provide meaningful bases for differential diagnosis because of the overlaps. Differential diagnosis, of course, is only meaningful if it provides the basis for differential treatment and prognosis. The study also suggests that childhood schizophrenia is not a unitary entity.

Gittelman, M., and Birch, H. G. Intellect, Neurologic Status, Perinatal Risk and Family Pathology in Schizophrenic Children. *Archives of General Psychiatry,* 1967, *17,* 16-25.

Purpose: To analyze relationships between IQ, evidence of organicity (including evidence of perinatal CNS damage), and family psychopathology in childhood schizophrenia.

Subjects: Ninety-seven children ranging in CA from 4 to 19—53 current and 44 former pupils of a day school for severely disturbed children. At some point all had been diagnosed as childhood schizophrenics; the male to female ratio was approximately 4:1.

Procedure: Data were collected on intellectual status and IQ stability, time of first professional notice, ages of various developmental milestones, signs of neurologic dysfunction, evidence of perinatal complications, outcomes for most followup cases, and extent of familial psychopathology.

Results: Fewer than 30 percent of the cases had IQ's above 80, with about 60 percent having IQ's below 69. The scores were quite stable, with test retest correlations (mean interval of three and one-half years) between .80 and .90. IQ was inversely related to evidence of CNS dysfunction, and directly related to age of onset of clinical symptoms. Both early age of onset and low IQ were indicators of subsequent poor course. Perinatal complications were frequent, especially among subjects with subnormal intelligence. Familial pathology was not related to CNS pathology, a factor which was evident in 80 percent of the cases.

Comment: The present finding of no relationship between familial pathology and subject symptomatology is in contrast with findings reported elsewhere (e.g., Goldfarb, 1961). The prevalence of organicity in this sample, along with the failure to find a correlation between degree of pathology in the family and subject characteristics, is antithetical to a psychogenic explanation of childhood schizophrenia. Moreover, the prevalence *and* stability of low IQ's, along with frequent rediagnosis of cases as "mental defectives" and the like, suggest the possibility of reconstruing many cases of childhood schizophrenia as a special variant, or cluster of variants, of mental retardation. The social and programatic consequences of such redefinition deserves attention.

Jenkins, R. Psychiatric Syndromes in Children and Their Relation to Family Background. *American Journal of Orthopsychiatry*, 1966, *36*, 450-457.

Purpose: To determine the relationship between family background factors and five psychiatric symptom clusters.

Subjects: Five hundred cases from the Michigan Child Guidance Institute.

Procedure: Five clusters of deviant behaviors were derived from 90 manifest behaviors noted in subjects' case records: shy seclusive, overanxious neurotic, hyperactive distractible, undomesticated, socialized delinquent. These five were correlated with family background factors presumed to have substantial etiological significance, such as education, condition of home, regularity of meals, kind of work, maternal rejection, history of prolonged serious illness, etc.

Results: The inhibited children tended to be from homes with both parents present, while this was less likely in the case of aggressive children. Mothers of inhibited children were rarely hostile towards the child, and these children did not feel rejected; however, mothers of aggressive children were often openly hostile. Most of the overanxious neurotic group had a history of serious illness, and often came from middle class homes. Nearly half of the children had mothers who were described as neurotic. Chronic illness was frequent in mothers of shy seclusive children, and one in six of these mothers was considered mentally inadequate. The socialized delinquent was found to be a product of neglect and poor neighborhood, rather than of maternal rejection. The background of the undomesticated child characteristically showed a lack of sufficient maternal love and acceptance in early life.

Comment: This study represents a step toward reducing the grab bag term of emotional disturbance to manageable proportions by attempting to relate specific background variables to specific kinds of behaviors. However, one should be cautious in inferring cause and effect from concomitant variation.

Chess, Stella, Thomas, A., Rutter, M., and Birch, H. Interaction of Temperament and Environment in the Production of Behavioral Disturbance in Children. *American Journal of Psychiatry*, 1963, *120*, 142-147.

Purpose: To determine which variables might contribute to normal and pathological personality formation, as well as the nature of the interaction between them.

Subjects: A subsample of 29 subjects was drawn from a group of 136 subjects already under longitudinal study. The subsample consisted of children with CA's of 29 to 84 months for whom psychiatric consultation had been requested because of persistent concern over the child's behavior on the part of the parents and/or the school. The presence of "significant problems" was corroborated by psychiatric opinion.

Procedure: The behavior disorder subsample was compared with the rest of the children in the longitudinal study through an introspective process, using data on both temperament and environmental influence which had been gathered at three month intervals, before the child was considered a problem by parent or professional.

Temperament was defined as the characteristic mode of functioning of the child, and included activity level, rhythmicity, adaptability, approach-withdrawal, etc. Environmental influences included the response patterns of parents and significant others to different temperamental stimuli from the children.

Clinical cases were analyzed quantitatively to determine which characteristics showed a predictive relationship to a later development of aberrant behavior, and were analyzed qualitatively to trace the ontogenesis of behavioral disturbances in terms of the interaction between temperament and environment. In the quantitative analysis, the first 21 clinical cases were compared with the oldest 71 children in the study who did not manifest behavioral disturbances.

Results: Quantitative Analysis—The 21 clinic cases were divided into active (e.g., tantrums, etc.) and passive (e.g., nonparticipation in play with other children or lack of aggressiveness) groups. From the first year of life, active subjects showed more irregularity, nonadaptability, and negative mood than the nonclinic cases. Significant differences were also found between these clinic cases and their siblings raised in the same home. Passive subjects differed from active ones on a number of variables, also.

Qualitative Analysis—Two pairs of children (one of each pair having developed a behavior disturbance), each showing similar temperamental characteristics from early infancy, were compared. It was the interaction between temperament and environment that produced the disturbance. The temperamental characteristics during the first three years of life were considerably different in children who later came for psychiatric consultation.

Comment: This is an excellent study which presents longitudinal data regarding the genesis of disturbed behavior. The anterospective design helps to eliminate bias and error in reporting. The parsimony in explaining behavior might well serve as a model.

In Review

The etiology of childhood psychosis remains elusive, although not quite as mysterious as was once the case. It is apparent that in some cases of early infantile autism or schizophrenia the child is "different" from birth, but the reasons for this, as well as preventive measures, are still unknown.

Attempts to specify the nature of the interaction between the behaviorally disordered child's temperament and responses to him from his environment offer a fruitful avenue for investigation and possible eventual control of disturbed behavior. Such investigations are already in progress, and refined methodology should lead to substantial advances in the specification of conditions under which disturbances are likely to occur. The introspective design and Q techniques are examples of such refinement.

Epidemiology

There is a serious lack of standard terminology in the field of children's behavioral disorders; in fact, there is no common definition of behavioral disorder for children. Estimates of the number of disordered children vary widely, but there is little actual data on which to base estimates or planning. In this section, studies of prevalence of behavioral disorders in children and reporting practices will be reviewed.

Lyons, Dorothy, and Powers, Virginia. Follow-up Study of Elementary School Children Exempted from Los Angeles City Schools during 1960-1961. *Exceptional Children,* 1963, *30,* 155-162.

Purpose: To determine the kinds of problems presented by children exempted from school.

Subjects: Six hundred sixty-one (582 boys and 79 girls) children exempted from Los Angeles City Schools for varying lengths of time because of extreme behavioral or emotional problems.

Procedure: Data regarding type of diagnosis, kind of exemption, characteristics of exempted children, and number of schools using exemption were tabulated and a questionnaire prepared and scored.

Results: The most frequently reported causes of exemption were emotional instability and hyperkinetic behavior. Intelligence was not a discriminating factor in diagnostic categories; however, the greatest number of exemptions for any IQ range was in the 70 to 79 group, the next highest being in the 80 to 90 group. Most exempted children appeared to be borderline, such as slow learning children, who were thought to have a higher potential than those ordinarily placed in special classes. Only a small percentage of pupils from the superior IQ range (120-149) were exempted because of emotional problems.

The kind of exemptions recommended depended on the child's ability to tolerate school attendance and ranged from one hour to full time; 61.3 percent were exempted on a part time basis and 38.7 percent were exempted on a full time basis. More children were exempted at lower than at upper grade levels, and more children were exempted from special than regular classes.

Full or part time exemption was often recommended pending special placement. Upon return to school these children were placed either in adjustment classes or special classes for the retarded; assignments were often made on a trial basis. Children who did not return to school were either attending private schools, detained at juvenile hall, under psychiatric observation, or awaiting placement in a state hospital, and a large percentage of the children had moved from the district.

Comment: Although data are not given, the factor of social class may be relevant; the preponderance of lower IQ cases might lead one to suspect this possibility. Perhaps if a child is a rapid learner his value is enhanced to the teacher, whereas if the child is a slow learner as well as a behavior problem, he is more likely to be suspended. Also noteworthy was the observation that child guidance clinics were reluctant to work with children who had been labeled retarded. It appears that some labels still serve as excuses not to act, rather than as cues for differential remedial programs.

Lapouse, Rema, and Monk, Mary. Behavior Deviations in a Representative Sample of Children: Variation by Sex, Age, Race, Social Class and Family Size. *American Journal of Orthopsychiatry*, 1964, *34*, 436-446.

Purpose: To determine if: (a) there are sex differences in the occurrence of behavior deviations; (b) the prevalence of deviations change as children grow older; (c) there are variations according to socioeconomic class and race; (d) deviations occur differentially in only children and children with siblings; and (e) certain subgroups are more likely to deviate from the behavior patterns prevailing among the general population of children.

Subjects: A random sample of 482 children, ages 6 to 12.

Procedure: Mothers were interviewed about one of their children by means of a structured questionnaire. The questions were designed to elicit spontaneous information about the presence, frequency, and intensity of a wide range of personal behavior and adjustment characteristics. Questionnaires were scored, and deviance was defined as the highest scoring 25 percent of the children in the total sample.

Results:

1. Behavior deviations occurred more frequently in boys than in girls.
2. Deviations were more prevalent in younger children than in older children.
3. Behavior deviations were more frequent in Negro children when compared with white children in general. The group of white children was divided in half, according to socioeconomic class, and there was no difference between the two groups thus formed. Behavior deviations were more frequent in Negro children than in the lower group of white children, but since the groups were not equated for socioeconomic class (white group being higher), the racial difference, per se, could not be evaluated.
4. No significant difference was found in the occurrence of deviant behavior between only children and children with siblings.
5. The subgroups most likely to deviate from prevailing norms are, in descending order, younger school aged children, Negro children, and boys.

Comment: Race or social class of interviewers, as well as the fact that information was given by mothers, may have caused some bias in results. Nevertheless, this is an important study in terms of data collection method and analytic techniques used. It gets at the important question as to whether behavioral disorders are a phase of growth or a more permanent condition. This study obliquely suggests that an intervention approach based on principles of managing symptomatic behavior may be more appropriate than one which does not favor handling manifest behaviors, per se.

Rose, Beatrice, Bahn, Anita, and Kramer, M. Demographic and Diagnostic Characteristics of Psychiatric Clinic Outpatients in the U.S.A. 1961. *American Journal of Orthopsychiatry*, 1964, *34*, 455-468.

Purpose: To study patterns of utilization of community outpatient clinics in various parts of the US as an aid in planning.

Subjects: Data submitted to the National Institute of Mental Health by 80 percent of the 1,589 outpatient clinics throughout the country.

Procedure: 1960 census data were used to determine rates of clinic utilization by age, sex, color, marital status, diagnosis, and geographic region. Clinic termination data were used to estimate admission rates;

this was possible because of the short duration of clinic care for most patients.

Results: (Only data for children will be summarized.) The termination rate for children was 212 per 100,000 child patients, which was 16 percent higher than for adults; the rate was twice as high for boys as for girls.

There were large regional differences, perhaps reflecting differences in availability of clinic resources. More professional man hours per week were expended in the Northeast than any other section of the country; this was followed by the North Central, West, and then South.

With respect to age, the peak rate for boys occurred at 9 and again at 14 years, and occurred for girls between 15 and 17. The rates declined in late adolescence, particularly for males, and were lowest for children under five years. The percent of first admission to state hospitals for mental disorders increased steadily with age and was about 20 per 100,000 at 10 to 14 years of age.

With regard to type of disorder, brain syndrome rates were relatively high for the first decade of life; this diagnosis declined until middle age. Rates for mental deficiency without organic cause were higher during school years than were the rates for brain syndromes. Psychoses were diagnosed relatively infrequently in children, particularly girls. Beginning with adolescence the rates increased sharply. The rate for psychoneurosis rose earlier than the rate for psychosis, but declined in late adolescence for males before rising again.

The most frequent diagnosis for school age children was transient situational personality disorder, and this rate dropped shortly after school age of 18. Personality disorder was the second most frequent diagnostic category for children over five. For every major diagnostic group, rates for boys exceeded those for girls.

With regard to racial differences, the patterns of age curves for each disorder were similar for white and nonwhites of the same sex, but there was a great difference in the relative magnitude, with nonwhite rates higher for mental deficiency and lower for personality disorders, transient personality disorders, and brain syndromes. In the first 15 years, brain syndromes were principally associated with prenatal factors. Clinic rates were highest for the severely retarded between ages 5 and 9 and reached a maximum at 10 to 14 years for moderate and mild mental deficiency. Schizophrenia, childhood type, was counted at 8 or 9 per 100,000 for boys, and 3 per 100,000 for girls ages 5 to 14. Among the adolescents and young adults chronic undifferentiated schizophrenia began to emerge.

Comment: It should be underscored that these data refer only to the utilization of existing facilities. Since selection factors, such as availability of services, partially determine clinic admission, the present data probably do not reflect actual prevalence figures. The relatively short duration of clinic experience for nonwhites points to a need for reevaluation of the types and ways that services are made available. In addition, a need for modification of diagnostic classification becomes apparent.

Eiduson, Bernice, Johnson, Trinidad, and Rottenberg, D. Comparative Studies of Learning Problems Seen in Five Child Clinics. *American Journal of Orthopsychiatry,* 1966, *36,* 829-839.

Purpose: To determine if different syndromes reported in the literature for children with learning problems seen in various clinics are artifacts of sampling, are real differences, or are differences in information obtained from idiosyncratic data collecting procedures of individual clinics.

Subjects: Fifty case records of learning problems. Ten records were selected from each of five child psychiatry clinics. Selection was limited to records of subjects who were boys of at least average intelligence and who had a CA of 70 to 140 months. Subjects had to have been referred to the clinic primarily for academic problems and the records selected had to be illustrative of the characteristic data collection procedures of the institution. Boys with gross pathology or central nervous system damage were excluded.

Procedure: Each record from each clinic was comprehensively transcribed into a computer-acceptable form by an information processing system.

Results: Differences among the clinics resided in the detail and depth of inquiry rather than in areas of focus. However, when the 50 records were searched for events which were invariantly collected in every case, only *two* events—date of birth and information on academic performance in school—were uniformly reported. Even within clinics there were wide variations in data collection despite common frames of reference and common forms and outlines for the interviews. It was found that in order to have 80 comparable variables for comparative purposes, the sample had to be cut in half. Also, 17 percent of the recorded data were unique to a specific institution, obviously affecting the drawing of meaningful inferences from the data.

Comment: This study highlights the need for uniform reporting procedures and greater skepticism in accepting studies from particular institutions without replication. It also helps to explain the vast amount of contradictory information reported in studies and underscores the field's basic weakness in this fundamental area.

Stennett, R. F. Emotional Handicap in the Elementary Years: Phase or Disease? *American Journal of Orthopsychiatry,* 1966, *36,* 444-449.

Purpose: To ascertain the extent to which the adjustment problems of emotionally handicapped children (EHC) may be self healing.

Subjects: Students from a typical rural northern Minnesota school district serving 1,500 children.

Procedure: In 1961 a modified version of the identification process developed by Bower was applied to all children in grades four, five, and six. A measure was obtained of each youngster's ability, achievement, his teacher's perception of him (rating scale), his classmates' perception of him (sociometric), and his perception of himself (self test). Twenty-two percent of the 333 students studied were identified as either moderately or seriously emotionally handicapped children.

Alternate revisions of the Bower screening, relying more heavily on teacher and peer ratings, were administered during successive years with respect to the sample. An academic progress chart was prepared for 198 of the fifth and sixth graders.

Results: About 5 to 10 percent of the children enrolled in elementary schools could be identified as having adjustive difficulties of sufficient severity to warrant professional attention. The screening devices available were generally quite adequate for the identification process. A significant number of children identified as emotionally handicapped were not likely to resolve their adjustment problems without help. The emotionally handicapped youngster tended to lag progressively farther behind his peers in academic achievement as he moved over the elementary years.

Comment: This study presents longitudinal evidence that some emotionally handicapped youngsters do not "grow out of" their disability and that an emotional handicap is highly correlated with an academic disability which grows progressively more serious. It is important to develop more precise measures to isolate specific factors in need of remediation, as well as instruments to differentiate between those youngsters who will spontaneously improve and those who need intervention programs. The contradictory findings of this and the Lapouse study (Lapouse and Monk, 1964) point to the need for replication and much more precise explication of terms.

In Review

The area of epidemiology, upon which planning for personnel and physical plants should be based, is one of the weakest in the field. Some of the data recently reported are 10 years old, and, in an era of rapidly expanding and shifting populations and social upheaval, the use of obsolete data may result in inaccurate conclusions and planning. Standard terminology and reporting procedures, as well as more demographic studies, are needed.

Predictive Studies

This next section describes instruments and methods of predicting behavioral disorders.

Maes, W.R. The Identification of Emotionally Disturbed Elementary School Children. *Exceptional Children,* 1966, *32,* 607-609.

Purpose: To improve the efficiency of Bower's approach to identifying disturbed children with weighted scores on a number of instruments.

Subjects: Forty emotionally disturbed children and their 548 normal classmates from 22 different classrooms, grades 4 through 6.

Procedure: Variables found by Bower to identify disturbed children were applied to and with respect to all subjects. The criterion was diagnostic study of children referred by teachers or others for problem behavior and only those who were thought to require individual psychotherapy were defined as emotionally disturbed.

A multiple regression analysis was performed with Bower's techniques on half of the normal and disturbed samples, and those techniques which best predicted the criterion were used to derive weighted scores for the rest of the sample. One of Bower's techniques, teacher ratings of behavior and physical status, was examined for item differentiation between disturbed and normal children, and only those items with significant discriminatory power were retained.

These modified ratings and a self concept scale were combined with the other Bower measures and again tested for their predictive efficiency by multiple regression analysis on half of each sample. In turn, the best predictors were tried on the other half.

Results: It was found, first, that all of Bower's techniques, when weighted per his approach, significantly correlated with disturbance, thereby cross validating Bower's findings. Multiple regression analysis on the unmodified Bower measures yielded three variables—teacher rating behavior, group IQ, and arithmetic achievement—which were thought to be significantly predictive to warrant being combined and tested as joint predictors of the criterion on the second half of the sample. This abbreviated battery was not significantly less predictive than the six test battery suggested by Bower. After modifications were made in teaching ratings, a new multiple regression analysis yielded only two tests in the attenuated battery: teacher rating and intelligence. These two tests, when combined, were more highly correlated with the criterion than all of Bower's measures taken together.

Comment: In this study, the author defines children as emotionally disturbed only if they are "...sufficiently disturbed to require individual psychotherapy." The criterion problem is a major one in prediction and identification studies. In Maes' study, a condition is defined in terms of a highly circumscribed treatment approach, rather than being guided by children's characteristics which should dictate the needs of the program, and *not* the other way around.

Balser, B. E., Wacker, E., Gratwich, M., Mumford, R. S., Clinton, W., and Balser, Paula. Predicting Mental Disturbances in Early Adolescence. *American Journal of Psychiatry,* 1965, *121, XI-XIX.* (Afterword)

Purpose: To design a technically simple device for prediction of impending failure in early adolescent children of normal or above normal intelligence.

Subjects: Entire classes in four high schools (three private and one suburban) servicing children of normal and above normal intelligence. It could be assumed that the SES of the group was considerably above average.

Procedure: A 12 item prediction chart, with each item on a five point scale, was used. Students were rated by four teachers on motivation, industry, initiative, influence and leadership, concern for others, responsibility, emotions, activities (in and out of school), truancy, academic average, adjustment, and age. In one school, 430 subjects were screened, and failure was predicted for 39 of them.

Results: In a five year followup, 92 percent of these 39 subjects failed in school or developed behavioral or academic difficulties.

Comment: Identification and prediction no longer seem to be a problem for certain kinds of school disturbances. This is true at both the elementary and secondary levels. Emphasis might now be placed on development of intervention programs.

Lane, Ellen A., and Albee, G. Childhood Intellectual Differences between Schizophrenic Adults and Their Siblings. *American Journal of Orthopsychiatry*, 1965, *35*, 747-753.

Purpose: To determine if children who later became adult schizophrenics performed more poorly on intelligence tests than did their siblings who did not become schizophrenic.

Subjects: School records of 156 children, later identified as adult schizophrenics, and their normal siblings; 55 pair of siblings had taken a Kuhlmann-Anderson IQ test in the second grade; 60 had taken the Cleveland Classification Test in sixth grade; and 41 had taken a Terman McNemar test. About 75 percent were male and 40 percent were Negro; most came from schools in deprived areas of the city.

Procedure: The childhood IQ's of the sibling pairs were compared. In those cases where the schizophrenic adult had more than one sibling, the mean score for siblings was used.

Results: A large majority of the schizophrenics-to-be performed consistently and considerably lower on intelligence tests than their siblings. IQ's of normal siblings usually correlate about .50, but in these cases the correlation was not significant.

Comment: From these results, one might conclude that schizophrenia has its roots and measurable effects in early childhood, probably before recognizable symptoms appear.

With all the pitfalls inherent in *ex post facto* research, this type of basic study represents a step toward prediction rather than mere description.

In Review

It appears that behavioral problems in childhood or adolescence can be predicted with reasonable accuracy using relatively simple instruments. Prediction of adult schizophrenia is not very accurate, however, and the possibility of planning long range intervention has not yet been realized.

Before more specific screening measures, i.e., differential diagnosis, are employed, it should be demonstrated that categorization clearly implies both differential treatment and prognosis. Otherwise, time and manpower would be wasted.

CORRELATES

This section deals with empirical behavior correlates and schema to map such correlates.

Empirical Behavior Descriptions

Spivack, G., and Swift, M. S. The Devereux Elementary School Behavior Rating Scales: A Study of the Nature and Organization of Achievement Related Disturbed Classroom Behavior. *Journal of Special Education*, 1966, *1*, 71-90.

Purpose: To examine, as part of a general project to develop an objective measurement technique for classroom relevant behavioral disturbances, the efficacy of a rating scale for children in regular and special classes, and to study the factorial structure of the scale in both regular and special class settings.

Subjects: Two hundred twenty-five boys and 102 girls in special classes for the emotionally disturbed, and 126 boys and 126 girls in regular elementary school classes, grades K through 6.

Procedure: Twenty regular class and 29 special class teachers were trained in the use of a 111-item elementary school behavior rating scale. Information regarding age, sex, IQ, and achievement was included and a factor analysis was performed.

Results: There were 13 interpretable factors in each group, 12 of which were common to both: creative initiation (verbal), classroom disturbance, comprehension, slowness in work, external reliance, externalization of blame, inconspicuousness, inattentive withdrawn, irrelevant responsiveness, achievement anxiety, need for closeness with teacher, and need for achievement recognition. The factor which emerged for normal but not for emotionally disturbed children was impatience. The factor which was obtained for disturbed children but was not shared by normals was disrespect defiance. These formed two clusters, one which the authors termed "acting out" or "poorly self-controlled behavior," and another which related to inabilities to learn and attend, and to self initiate a course of action.

Comment: This represents a major step toward eventually objectifying educationally relevant behaviors, referral bases, and evaluation of program effectiveness.

Quay, H., Morse, W., and Cutler, R. Personality Patterns of Pupils in Special Classes for the Emotionally Disturbed. *Exceptional Children,* 1966, *32,* 297-301.

Purpose: To investigate the basic dimensions which might underlie the observed interrelationships of a representative number of deviant behavior traits.

Subjects: Four hundred forty-four children, about 80 percent boys and 20 percent girls, with mean ages of 9.4 and 9.8 respectively. The sample classes varied widely in geographical locus and represented many different philosophies of placement and program operation.

Procedure: The special class children were rated by their teachers on the Problem Behavior Rating Scale. Traits present in at least 10 percent of the cases were subjected to a factor analysis.

Results: The three factors of conduct problem, inadequacy immaturity, and personality problem accounted for 76 percent of the variance.

Comment: This kind of research is helpful in the development of a taxonomy for the education of the behaviorally disordered, and is also a point of departure for further studies.

In Review

The above empirically based studies represent a necessary beginning toward planning and assessing programs for behaviorally disordered children.

Social and Economic Factors

Increased attention is now being paid to social and economic factors in the genesis and amelioration of behavioral disturbances. Further, the biases of those who label children as emotionally disturbed are being scrutinized. In this section studies which describe the ecology of the child are exemplified.

White, Mary Alice, and Charry, June (Editors). *School Disorders, Intelligence, and Social Class.* New York: Teachers College Press, 1966.

Purpose: To determine if pupils identified as having difficulties in school differ from the total school population with respect to socioeconomic status (SES), IQ, sex, achievement, and grade/age and to determine if the chain of actions from initial referral to final disposition might be related to these variables.

Subjects: Pupils referred for study in a suburban county within a large metropolitan area ($N = 2{,}866$).

Procedure: Forty-six school psychologists responsible for evaluation of the referred sample filled out questionnaires for each subject indicating vital statistics, referral sources, reasons for referral, diagnostic services, diagnostic impression, recommended action, and the psychologist's estimate of probable effect of his recommendation. In addition, data on socioeconomic status were obtained.

Results: Most referrals came from upper SES and these cases were more likely to be parent referrals. Those lower SES cases that were referred typically came from school sources.

An analysis of the chain of action after diagnosis showed that those children and/or their families were recommended for psychological treatment who had the "best" prognosis, i.e., higher IQ's and achievement, higher SES, and lower severity of disorder. Among reasons for referral, "learning difficulties" was checked in 27 percent of the cases, followed by 14 percent for "intelligence evaluation," 13 percent for "emotionally upset," and 11 percent for "acting out in the classroom," with six other reasons accounting for the remaining 35 percent. It was found that "school disorder" as defined in the study was more likely to be related to low IQ than to low SES.

Comment: These findings suggest that school psychologists choose to attend least to those cases which require the most attention. Despite certain methodological weaknesses, the project deserves to be sharpened and replicated in different census tract areas.

McDermott, J. F., Harrison, S. I., Schrager, J., and Wilson, P. Social Class and Mental Illness in Children: Observations of Blue Collar Families. *American Journal of Orthopsychiatry*, 1965, *35*, 500-508.

Purpose: To explore the relationship between social class and mental illness in children.

Subjects: Case records of 450 children evaluated at the University of Michigan's Children's Psychiatric Hospital during the year July, 1961-July, 1962. Using paternal occupation as the indicator of social class, a final sample of 263, assigned to the blue collar group, was chosen. This was further broken down into unskilled ($N = 148$) and skilled ($N = 115$).

Procedure: The two groups were matched on age, sex, religion, race, working mother, etc., and were compared in terms of diagnosis, symptomatology, and historical data. Symptoms were categorized as benign or malignant. Benign included anxiety, obsessive compulsive symptoms, and somatic complaints, and malignant included thought disturbances, affective disturbances, impulsivity, and paranoia. Assignments were based on the observations of the attitudes towards these symptoms prevalent in the reports of mental health workers of the CPH clinic.

Results: Personality disorders, including borderline psychoses, were diagnosed significantly more often in the children of the unskilled workers. Overt hostility, impulsivity, paranoid reactions, affective disturbances, and withdrawal were seen more frequently in the unskilled group, while anxiety, obsessive compulsive behavior, and somatic complaints were more characteristic of the skilled group.

It was found that children with the low SES were characterized by evaluators as coming from unstable, conflict ridden homes, while those from the higher SES group were seen as coming from more stable homes. Objective measures such as divorce and separation rate did not bear this out, however.

The skilled group was doing significantly better in school. It was found that there was a much longer delay in clinic referral of the unskilled group from the time that problems first became apparent.

Comment: It appears that professionals view the two social class groups quite differently and a considerably longer time elapses before professional help is requested (if it is requested at all) for children from unskilled families. It is conceivable that the different perceptions of the two groups come from the different life styles of the children, but it is also quite possible that biases exist within the examiner.

Menlove, Frances Lee. Aggressive Symptoms in Emotionally Disturbed Adopted Children. *Child Development*, 1965, *36*, 519-532.

Purpose: To determine if there are more emotionally disturbed adopted children with aggressive type symptoms than are found in a comparable group of nonadopted children, and to determine whether aggressive and delinquent behavior is less characteristic of children adopted at an early age than of those adopted later.

Subjects: Fifty adopted children were drawn from a population of 1,314 children seen for outpatient evaluation at the Children's

Psychiatric Hospital, University of Michigan. All subjects were white and lived with both parents. A control group matched on several variables was used.

Procedure: Measures used for the dependent variable of aggressiveness were fire setting, temper tantrums, legal difficulties, and sadism; these were rated as Present or Not Present by a social worker. The intake psychiatrist also rated other problems such as eating, sleeping, continence disturbance, phobic symptoms, etc.

Results: It was found that more adopted children evaluated at the CPH had symptoms and syndromes related to aggressive behavior then found in a comparable group of nonadopted children.

No evidence was found to indicate that children placed before six months differed significantly from those children placed after six months.

Comment: The selective sample and such confounding factors as family size and heredity limit any conclusions that might be reached from such a study. There is some suggestion that disruption in family life might be associated with antisocial behavior.

Pedersen, F., and Sullivan, E. Relationships among Geographical Mobility, Parental Attitudes and Emotional Disturbances in Children. *American Journal of Orthopsychiatry,* 1964, *34,* 575-580.

Purpose: To determine if there is a relationship between geographical mobility, parental attitude toward mobility, and personality disturbance.

Subjects: Twenty-seven male children (CA range of 11 to 15) primarily from army families, diagnosed as disturbed but nonpsychotic. Ten children showed aggressive, acting out disorders and the remainder presented a variety of internalized, neurotic symptoms.

Thirty children of comparable age and mobility were used as a comparative group; any child with a history or symptoms of disturbance was excluded from this group.

Procedure: Historical data on residential mobility were secured by interviews. Parental attitudes towards Acceptance of Mobility and Identification with the Military were assessed by an attitude scale.

Results: There was no relationship between mobility and emotional disorders. There were significant differences between the disturbed and comparative group on the parental attitudes on Acceptance of Mobility Scale (for mothers only, $p < .05$) and for both parents on Identification with the Military ($p < .01$).

Comment: The study is limited, due to the sample scope, but it does suggest that repeated family relocation may not be an etiologically significant factor in and of itself.

The study suggests that parental attitudes can mediate stress effects so that actual historical variables may be of relatively minor significance. Children whose parents identify with a new concept of "community," i.e., corporation, military service, university, etc., have less disturbance than those who identify community in terms of propinquity.

In Review

The above studies are only a sample of those concerned with ecology. Professionals are becoming more aware of their own biases and distortions in working with people from different social classes, as well as the vast differences in the quantity and quality of services offered to children.

The nuclear family and the neighborhood community which has characterized so much of American life is rapidly changing. This has created a whole new set of problems which mental health professionals are now beginning to understand. Observations are now being directed toward extrafamilial phenomena and child rearing practices of extended, matriarchal, foster care, and adoptive families.

Physical Factors

Physical well being and physiological effects are often viewed as intimately, if not causally, connected with behavior. This next section presents a few of the many studies in this area.

Wood, R. H. Intrajudge Reliability in Clinical Electroencephalography. *Journal of Clinical Psychology*, 1966, *32*, 150-154.

Purpose: To investigate intrajudge reliability in clinical electroencephalography and to ascertain whether the intrajudge reliability varies according to type of subject.

Subject: A professional electroencephalographer with a Ph.D. in psychology who had completed postdoctoral training in electroencephalography at an accredited neuropsychiatric training institute.

Procedure: Except for CA and sex all identifying data were removed from EEG records of 15 pairs of boys matched on all relevant behavior except classroom conduct. The EEG's were coded and placed in random sequence. The records were judged by the electroencephalographer. The records were then placed in a new random order and rejudged after eight months.

The judge was required to duplicate his initial performance on a reading of the records.

Results: Generally, the electroencephalographer was unable to duplicate his first interpretation, even on the clinical classification of the record.

Comment: This study points up the problems of scanning that are analagous to other problems in clinical judgment. It also casts doubt on the validity of many studies where a large *N* is used but a single judge is used for rating.

Lefkowitz, M., and Cannon, J. Physique and Obstreperous Behavior. *Journal of Clinical Psychology*, 1966, *32*, 172-174.

Purpose: To compare short and tall boys on ratings of obstreperousness and self rating of personality.

Subjects: Seventy-eight boys (70 white and 8 Negro) institutionalized in a treatment center for disturbed delinquents. The mean CA was 15-2 with a mean IQ of 104. Subjects had to be at least 14 years old and have a reading level of 6.5 on the Stanford Achievement Test, so that the MMPI could be administered.

Procedure: Height at the time of admission to the institution and social class as measured by father's occupation (Warner's Revised Scale of Rating Occupation) were used in the analysis. A modified version of the Katz Adjustment Scale was completed by cottage parents as an index of obstreperousness. The MMPI was administered.

Results: Height was significantly related to social class, with shorter boys coming from the lower social class. When social class was controlled, cottage fathers rated the short boys significantly higher on obstreperousness, negativism, and aggressiveness. When social class was not controlled, judgment of belligerence by cottage fathers was significantly related to subjects' height; this relationship did not obtain when cottage mothers did the rating. Correlations between height and MMPI scales were not significant.

Comment: This study demonstrates that there is a relationship between physical factors and behavior. The authors were able to accurately predict cottage behavior from just two variables—height and social class.

Fox, R., and Lippert, W. Spontaneous GSR and Anxiety Level in Sociopathic Delinquents. *Journal of Consulting Psychology*, 1963, 27, 368.

Purpose: To determine whether manifest anxiety is correlated with state of arousability in delinquent subgroups.

Subjects: Twenty male inmates at a juvenile court detention center, 10 of whom were diagnosed as having Sociopathic Personality Disturbance, Antisocial Reaction (low manifest anxiety), and 10 as having Personality Pattern Disturbance, Inadequate Personality (high manifest anxiety). The groups did not differ with respect to age, race, or IQ.

Procedure: Bi-palmer conductance was continuously measured, with subjects under instruction to relax, over a 10 minute recording session. Spontaneous activity was assessed in terms of decrements in resistance. Basal skin conductance level was also assessed, with values taken each minute of the 10 minute session.

Results: The Inadequate Personality (IP) group showed significantly greater spontaneous activity than did the Sociopathic Personality (SP) group. There were no significant differences between the groups in basal skin conductance level. There was a significant negative correlation between basal skin conductance and spontaneous activity in the IP group, but these measures were not significantly related for the SP group.

Comment: It is interesting that the two groups under report differed not only on apparent arousability, but also on both the degree and direction of relationships between the two measures. Failure to find a difference between these groups on basal skin conductance, while possibly an artifact of the method, is also noteworthy. Since some writers have suggested differences in conditionability among diagnostic subgroups, it may be that some such differences are a reflection of initial arousal level, rather than inability to "learn" *per se.*

In Review

It is conceivable that increased sophistication along these lines might ultimately lead the way to techniques involving direct physical intervention, currently illustrated in limited fashion by drug therapy. By and large, however, behavioral intervention will probably prevail for some time to come.

Personality Factors

Studies in this next section are representative of much of the literature on personality studies of behaviorally disordered children.

Epperson, D. C. Some Interpersonal and Performance Correlates of Classroom Alienation. *School Review,* 1963, *71,* 360-376.

Purpose: To study two aspects of alienation (isolation and powerlessness), along with certain social relational and academic performance correlates of alienation, in the classroom.

Subjects: Seven hundred fifty-three pupils, mean IQ "slightly above average," from grades 3-12.

Procedure: Questionnaires administered to subjects included (a) a measure of isolation which was conceptualized as the assignment by a subject of low reward value to behaviors which he sees as highly valued by others in his class; (b) indices of powerlessness, defined as subject's expectancy that his own behavior is not instrumental in acquisition of high valued classroom rewards; (c) exclusion, defined as subject not being considered by peers, or by the teacher, as a person with whom "they feel intimate"; and (d) actualization or the degree to which teacher assigned academic performance is commensurate with IQ.

Results: Expressed subject isolation was found to be related to teacher but not to peer exclusion. If a subject saw himself as "powerful" or "powerless," both with respect to tasks and social relations (but not to only one objective), this was found to be related to the degree of peer exclusion. Actualization, or the achievement ability discrepancy, was related to felt isolation and also to powerlessness, i.e., the more the degree of isolation and powerlessness, the greater the discrepancy between ability (IQ) and teacher assigned achievement. This was especially the case when both powerlessness and isolation were high in a given subject.

Comment: This study illustrates a continuing problem in research of this nature, i.e., how does one differentiate between concomitant and "causal" phenomena? A likely answer to such problems is found through careful developmental and preferably longitudinal study.

Feldhusen, J. F., and Thurston, J. R. Personality and Adjustment of High and Low Anxious children. *Journal of Educational Research,* 1964, *56,* 265-267.

Purpose: To investigate the relationships between manifest anxiety and general emotional adjustment, achievement ability discrepancy, and self concept integration.

Subjects: Sixty-four fifth grade pupils, 32 high anxious and 32 low anxious of normal and subnormal IQ, selected on the basis of Children's Manifest Anxiety Scale (CMAS) scores.

Procedure: In addition to the CMAS, Rorschachs, TAT's, and Draw-A-Person tests were administered and brief interviews conducted. Subjects were rated on emotional adjustment, achievement in relation to "capacity" (using *E*'s judgment of capacity and an otherwise undefined index of "performance"), and "integration self concept," i.e., a rating, presumably based on test data, of a person's "organization of ideas about himself." Subjects also were rated in terms of "need for psychotherapy."

Results: The groups differed significantly on self concept integration ratings. The high anxious group included more boys than girls, and about half of them were from special classes for the retarded; the low anxious group was split about evenly in terms of sex, and had few students from special classes.

Comment: At best, this study may be considered an attempt at validating the CMAS, which does not appear to be particularly sensitive as a screening device. The study points up the need for more sensitive instruments and refined methodology in studying and defining such abstruse concepts as "personality" and "adjustment."

Weinstein, Laura. Social Schemata of Emotionally Disturbed Boys. *Journal of Abnormal and Social Psychology*, 1965, *70*, 457-461.

Purpose: To determine whether disturbed boys symbolically organize interpersonal relations differently than do normal boys.

Subjects: Thirty-four male residents of a school for behaviorally disordered children (divided for two experiments into subsamples of 20 and 25, with overlap of 11 subjects between subsamples), and 59 public school boys, presumably normal (divided for the two experiments into subsamples of 20 and 39). Mean age was about 12 years in both main samples, mean IQ was about 95 (100 in Experiment II), and mean grade was 4.0.

Procedure: In Experiment I subjects were asked to spontaneously place felt cutouts of figures resembling a woman, man, and child, as well as two rectangles, in various pairings on a flannel board. Experiment II compared distance between subject placements of rectangles and of a male-female pair, against a standard which the subjects were asked to match from memory.

Results: Disturbed subjects were more likely to place father and child closer than mother and child, while the opposite was true for normals. Disturbed subjects were also more likely to put child-child pairs closer together than mother-child pairs, while the opposite was true for normals. The groups did not differ significantly on the following combinations: father-child versus child-child, and humans versus rectangles (both groups put rectangles closer together). In Experiment II, disturbed subjects were more likely to place rectangles closer together than human figures.

Comment: Procedures used in this study may prove fruitful in assessing progress in programs which are directed towards the amelioration of interpersonal conflict.

Davids, A. Stability of Personal and Social Preferences in Emotionally Disturbed and Normal Children. *Journal of Abnormal and Social Psychology*, 1964, *69*, 556-559.

Purpose: To examine the short term stability of disturbed and normal children's preferences for "people and things."

Subjects: Two groups, 34 public school boys and 38 boys undergoing residential treatment for various psychiatric disorders. Most of the latter group had been diagnosed as passive aggressive personalities, aggressive type.

Procedure: Subjects were questioned at the beginning and end of a 20 minute diagnostic session. At the beginning, each subject was asked to name his best friend, favorite color, and favorite ice cream (open ended). At the end of the sessions these attitude areas were reassessed but embedded in different contexts (e.g., on color preference, a subject was asked what color baseball cap he would like to have, etc.).

Results: On friendship choice, stability of preferences showed an orderly progression with age (CA range of 7 to 11) for the normal groups, but no developmental trend occurred with the disturbed group, with never more than half the group being consistent. Food preferences were also less stable and unrelated to development in the disturbed group. There was no difference in color preference between groups, both appearing relatively unstable. Stability was not generalizable across preference categories, e.g., consistency in friendship choice was not necessarily predictive of consistency in food choice.

Comment: This is fundamentally a reliability study and, as such, its findings on "instability" of response suggest that verbal criteria should be regarded with considerable caution, particularly in young children.

Kelly, F. J., and Veldman, D. J. Delinquency and School Dropout Behavior as a Function of Impulsivity and Nondominant Values. *Journal of Abnormal and Social Psychology*, 1964, *69*, 190-194.

Purpose: To determine if delinquency and dropping out of school are related to lack of impulse and a nondominant value orientation.

Subjects: Three hundred forty nondeviants, 52 dropouts, and 32 delinquents from seventh grade.

Procedure: The following were obtained: (a) four indices of psychomotor performance, presumably requiring impulse inhibition for successful execution; (b) several language measures to examine ability to maintain a convergent set, supposedly a measure of surgency or disinterest in detailed undertakings; and (c) three measures of value structure. Socioeconomic status was also assessed.

Results: Deviants showed more impulsivity than nondeviants and on symbolic tasks were inferior to nondeviants. There were no differences between deviant subgroups on these measures. Similar results were found for surgency. There were no significant differences between deviants and nondeviants on value measures.

Comment: The results of this study with respect to impulsivity are generally consistent with other research. Notwithstanding the possible danger of response bias in the measures of value orientation used, the idea that delinquents, dropouts, and conformers do not share dominant value systems may be a questionable one.

In Review

The work of personality theorists is often considered to provide a major basis for conceptualizing higher order behavior, and it seems in order to search personality theory for criteria of change as a function of intervention. The predilection of theorists to work with reference to pathology is a limiting factor; this inadequacy has often been noted, but remains uncorrected. Consideration of the theoretical issues related to objectives might prove to be helpful.

Educational Characteristics

Curriculum and teaching methodology for emotionally disturbed children comprise an area that has received little systematic attention. The teaching learning process for disordered children has not been explored extensively. There have been only a few attempts at identifying the learning characteristics of children who present behavioral problems.

Wilderson, F. An Exploratory Study of Reading Skill Deficiencies and Psychiatric Symptoms in Emotionally Disturbed Children. *Reading Research Quarterly,* 1967, 2, 47-74.

Purpose: To determine if different patterns of psychopathology can be identified and related to specific reading deficiency patterns in emotionally disturbed retarded readers.

Subjects: Fifty children (CA range of 9 to 14, 41 boys and 9 girls) who had been referred for evaluation and treatment of behavioral problems to the Children's Psychiatric Hospital, University of Michigan. The majority were from the lower middle and upper lower socioeconomic classes. Most had been referred through school initiated efforts with the presenting problem of maladaptive behavior and inability to adequately use their intellectual capacity in learning situations.

Procedure: The WISC and Gray Oral were administered. Those screened into the reading disability category (defined as at least a two year discrepancy between reading and mental age) then underwent psychological testing, psychiatric evaluation, and diagnostic reading testing. A detailed developmental history of the child was obtained by a social worker.

Results: The correlations between reading and psychiatric symptom factors were low, though some were significant. While there was some overlap between the psychiatric realm and reading skill, it was not high enough to make prediction practicable.

Comment: One of the basic questions in the field is how to group children—what is the consonance, if any, between psychiatry and pedagogy. This study suggests that educators should define their own parameters in working with disordered children, since educational and psychiatric characteristics of children might be considerably different.

Stone, F. Beth, and Vinton, N. R. Educational Disability in Emotionally Disturbed Children. *Exceptional Children,* 1964, *30,* 423-426.

Purpose: To determine whether a group of emotionally disturbed children would manifest educational disabilities, using both mental age and chronological age as bases for determining departures in educational achievement, and to examine the relationship between arithmetic and reading skills in emotionally disturbed children.

Subjects: Eighty-two boys and 34 girls, with mean CA of 12, referred to the Child Psychiatry Service of the State University of Iowa for possible diagnosis and treatment of emotional disorders. None had serious medical problems or psychiatric symptoms requiring isolation or confinement.

Procedure: Arithmetic computation and word recognition portions of the Wide Range Achievement Test (WRAT) were individually administered. WISC IQ's were also available.

Results: The majority of subjects scored below the expected levels of reading and arithmetic achievement, based both on MA and CA. Arithmetic scores were lower than reading scores.

Comment: The authors caution about inferring causal relationships between emotional problems and learning disability from their study. More information is needed regarding kinds of emotionally disturbed children and specific academic difficulties encountered by these children.

Graubard, P. S. Psycholinguistic Correlates of Reading Disability in Disturbed Delinquent Children. *The Journal of Special Education,* 1967, *1,* 363-368.

Purpose: To identify certain psycholinguistic correlates of reading disability in disturbed children.

Subjects: Twenty-three institutionalized children (CA range of 8-6 to 10-11) with normal intelligence and severe reading disability. Subjects had been placed in residential treatment because of antisocial behavior. There were no psychotic patients or suspected organics included in the study.

Procedure: The Illinois Test of Psycholinguistic Abilities (ITPA) and tests of auditory closure, right-left discrimination, and eye-hand coordination were administered. The institutionalized sample was compared to the normative population.

Results: No significant differences were found between verbal and performance scores on the WISC. There were differences between the sample and the normative group in communication processes. Deficits for the disturbed group were most marked at the nonmeaningful level of language (visual memory, grammatical closure, auditory memory) and in the visual motor channel. There was a lack of differentiation in language with little use of tenses or endings. A deficit was also noted with regard to directional confusion and left-right discrimination. Subjects had difficulty in predicting the whole from a part.

Comment: The results of this study argue that, in addition to residential treatment, special education programs are needed by disturbed, delinquency prone children.

In Review

There has been much speculation about education for disordered children, but there have been few studies of differences between groups of disordered children or even of differences between normal and disordered children. Basic issues in grouping, curriculum, and teaching methods have yet to be explored.

INTERVENTIONS

Prevention

Behavioral disorders are debilitating and expensive. Intervention procedures are costly and in many instances not particularly effective. The ultimate and most meaningful goal of all mental health work is prevention. While prediction and prevention may take many forms, the use of prognostic instruments may eventually prove to be effective.

The next section reports research related to prevention plans that have been used with children and adolescents.

Hodges, E. F., and Tait, C.D., Jr. A Follow-up Study of Potential Delinquents. *American Journal of Psychiatry,* 1963, *120,* 449-453.

Purpose: To evaluate instruments designed to identify disordered children and to evaluate the effectiveness of treatment.

Subjects: One hundred seventy-nine elementary school children in Washington, D.C., who presented problems in the school, especially by having committed antisocial acts directed against the school community. They came from a school and area with a high rate of delinquency and crime.

Procedure: The Glueck Delinquency Prediction Scale was administered; control and experimental groups were formed, matched on age, sex, race, delinquency prediction score, etc. The experimental group received treatment consisting chiefly of social casework under the supervision of psychiatrists. A few cases received psychotherapy.

Results: Eighty-one percent of the 144 selected as delinquency bound had shown some type of delinquency, and 45 percent had been adjudicated as delinquent. Of the original 21 rated as unlikely delinquents, only 6 percent had been adjudicated as delinquent. The treatment program showed no significant effect; 69 percent of the experimental group and 63 percent of the nontreated controls were delinquent.

Comment: This is another example of accuracy in prediction, with limited ability to change behavior.

Meyer, H., Borgatta, E., Jones, W., Anderson, Elizabeth, Grunwald, Hanna, and Headly, Dorothy. *Girls at Vocational High: An Experiment in Social Work Intervention.* New York: Russell Sage Foundation, 1965.

Purpose: To study the effect of social work services given to high school girls whose record of earlier performance and behavior at school revealed them to be potentially deviant.

Subjects: Four hundred urban high school freshmen. The group had mainly lower working class occupational backgrounds, and relative to the city census contained a disproportionate number of Negro girls.

Procedure: Experimental and control subjects were matched on a number of variables such as socioeconomic status, size of family, etc. Experimental subjects received intensive casework treatment and group therapy over an extended period of time. Therapy was carried out by experienced and well trained caseworkers, and therapists received supervision from leaders in the field.

Criteria of successful preventive treatment were: (a) school performance and behavior; (b) certain out of school behaviors such as delinquent acts or pregnancy out of wedlock; (c) personality changes as reflected through the Junior Personality Quiz and Make-A-Sentence Test; (d) general attitude as measured through questionnaires; and (e) sociometric data.

Results: Social workers felt that the majority of clients showed some change with group therapy; this was considered more successful than individual therapy. Nevertheless, the majority of subjects in both experimental and control groups did manifest difficulty in school. There were no significant differences between experimental and controls on any of the objective measures.

Comment: This study also points up successes in prediction of problems as well as the ineffectiveness of psychotherapeutic intervention with certain populations, even when sufficient numbers of well trained therapists are available.

Cowen, E. L., Zax, M., Izzo, L., and Trost, Mary Ann. Prevention of Emotional Disorders in the School Setting. *Journal of Consulting Psychology*, 1966, *30*, 381-387.

Purpose: As a cross validation of earlier research, to study the effectiveness of an experimental school program intended for early detection and/or prevention of emotional disturbance.

Subjects: One hundred thirty third graders, 65 of whom had taken part in an earlier experimental prevention program (Group E) and 65 of whom came from control schools (Group C). Groups were matched for IQ.

Procedure: The prevention program in the E school involved first-grade diagnostic evaluation, social work interviews with mothers, consultative services, after school activity programs, and parent and teacher discussion groups. E and C group evaluation took place in the last month of the third school year, and included school record measures, teacher evaluation scales, peer evaluation instruments, and self report and self evaluation techniques.

Results: E and C group comparisons over 19 criteria by t—tests yielded a minority of "significant" differences, all favoring the experimental school group. These included referrals to the school nurse, grade point ratios, SRA comprehension scores, an achievement aptitude discrepancy measure, overall teacher ratings, and Children's Manifest Anxiety Scale anxiety and lie scores. Within the E group, early detected subjects were differentiated from less suspect subjects on 14 out of 20 comparisons. These included most of the measures which were sensitive to E and C group differences.

Comment: In this study, the experimental program appears to be moderately successful in controlling pathology and somewhat more successful in early detection of problem cases. The latter finding is not surprising, but the former results stand in some contrast to a number of less successful attempts at prevention. Primary grade children may be more amenable than older children to the types of intervention which are involved here. Evaluations in this study were not conducted against baselines, and a comparison group of early detected but untreated subjects was not constituted.

In Review

It appears that, at least with adolescents and lower class delinquent prone boys, we lack the technology to prevent the occurrence of aberrant behavior. It is a significant advance that we can predict behavior but we are far from controlling it. The Cowen study shows us that with younger children there is more of a chance to prevent deviancy, but we cannot know which of the ingredients in that study were factors which produced success.

Treatment

Research regarding treatments in several settings, e.g., classroom, hospitals, out of school milieu, and detention centers, is reviewed here.

Craft, M., Stephenson, G., and Granger, C. A Controlled Trial of Authoritarian and Self-Governing Regimes with Adolescent Psychopaths. *American Journal of Orthopsychiatry*, 1964, *34*, 543-553.

Purpose: To compare the effects of differential treatment—intensive group psychotherapy with considerable self government versus an authoritarian governed hospital ward with minimal individual contact.

Subjects: Fifty male delinquents, aged 13 to 25, judged in need of psychiatric care. Subjects were of normal intelligence, had high previous conviction rates, high scores on Minnesota Multiphasic Inventory (MMPI) scales associated with delinquency, and were considered high risk cases.

Procedure: Subjects were assigned at random to one of the two treatment conditions. Duration of treatment was about one year.

Results: Subjects assigned to the authoritarian ward did significantly better than those in the group therapy ward on the following criteria: fewer offenses after release, improvement in IQ, improvement in the Q score of the Porteus Maze Test, and "better clinical state." The group therapy ward subjects showed a larger decrease in the *Si* score on the MMPI.

Comment: A followup study would be useful here.

> If the present results of this study do not conclusively show the authoritarian ward to be more effective, they certainly do not support the hypothesis that great personal attention from adults—psychotherapy in a wide sense—is any more effective than a minimum of attention.

Clearly, part of the problem in special education is not lack of personnel but how best to use those personnel and facilities which are available.

Quay, H. C., Werry, J. S., McQueen, Marjorie, and Sprague, R. L. Remediation of the Conduct Problem Child in the Special Class Setting. *Exceptional Children,* 1966, *32,* 509-515.

Purpose: To describe principles and illustrate applications of reinforcement theory derived behavior modification techniques on an experimental special class for conduct problem children.

Subjects: Five special class pupils.

Procedure: Three illustrations are provided. In one, baseline attending behavior of individuals in the class was obtained and then modified in the group with fixed ratio reinforcement. A second illustration concerns the simultaneous shaping in a six year old child of shift from primary to symbolic rewards, increasing delay of gratification, and ability to work on an intermittent reinforcement schedule. These objectives were set in 12 ten minute sessions built around the child's learning of the alphabet. A third aspect describes the training of two social skills by imitation, with a "recreational specialist" role playing and a gradual decrease of his support as peer group reinforcement increases.

Results: In the first illustration, after 52 days of brief daily reinforcement, an increase in the attending behavior of class members was observed. The second and third illustrations demonstrate the effect of individualized remediation techniques in areas of particular deficiency.

Comment: A principal attraction of these studies is that they are focused on modification of behavior in the classroom or group setting. Thus, they are particularly germane to the problems of meeting the needs of "conduct problem" children in ways that are economically feasible in the public school setting.

Staats, A., and Butterfield, W. Treatment of Nonreading in a Culturally Deprived Juvenile Delinquent: An Application of Reinforcement Principles. *Child Development,* 1965, *36,* 925-942.

Purpose: To replicate and extend a study of reading acquisition employing learning principles and reinforcement procedures in the context of remedial reading training.

Subjects: An adolescent delinquent with a long history of school failure and aggressive antisocial conduct. The subject was of normal intelligence, of Mexican American ancestry, and was beyond the control of his parents.

Procedure: The subject was trained in reading by a probation officer, using the technique of operant discrimination learning. The learning task consisted of having the subject emit the correct speech response while looking at a visual stimulus. If the correct response was not given, the trainer supplied the correct response but no reinforcement. Only correct responses were reinforced; an unprompted reading response on the first trial was reinforced more heavily than one that had previously been missed.

Results: In four and one-half months of experimental training, the subject moved from grade 2 level to 4.3. Retention was high and at the end of training the subject was getting half as much reinforcement per response as at the beginning of training. There was also a decrease in school misbehavior.

Comment: This study appears to open exciting possibilities for teaching reading to deviant children who do not respond to intrinsic rewards. This method appears to be economical and can utilize relatively untrained personnel. Gains in reading being attributable to the subject's getting attention from the trainer alone should be considered in this study. In the classroom, peer approval for misbehavior and failure to learn may serve as a reinforcer, especially in a delinquent population. This study, based on a one to one relationship, did not have to contend with that problem.

Brown, P., and Elliot, R. Control of Aggression in a Nursery School Class. *Journal of Experimental Child Psychology,* 1965, 2, 103-107.

Purpose: To control the aggressive behavior of boys in nursery school class using operant techniques.

Subjects: Twenty-seven nursery school boys 3 to 4 years of age.

Procedure: Two raters were trained in the use of a scale of physical and verbal aggression.

A one week observation period was used as a baseline. Two weeks later a two week treatment period was initiated, and ratings were taken during the second week of this period. For the next two weeks teachers were free to use previous methods of control followed by another two week treatment period with ratings taken during the second week (ABAB design).

The treatment consisted of ignoring all aggressive acts and rewarding cooperative behavior.

Results: Interjudge reliability for 24 five minute periods was .97. Ignoring of aggressive responses and rewarding cooperative ones had a significant effect upon behavior. Verbal aggression did not return to its previous level after the first treatment period, although physical aggression did.

Comment: This study demonstrates that application of extinction techniques to ongoing behavior in the classroom can effectively change behavior. It is interesting to note, however, that the specific objective of the study is questionable since certain forms of aggression in males are highly desirable.

LaVietes, Ruth, Cohen, Rosalyn, Reens, Renee, Ronalds, Ruth. Day Treatment Center and School: Seven Years Experience. *American Journal of Orthopsychiatry*, 1966, *35*, 160-169.

Purpose: To evaluate the effectiveness of a day treatment program and school which had been in operation for a seven year period.

Subjects: Thirty-eight children with a variety of psychiatric diagnoses who were not able to attend public school because of extreme pathology. Subjects had to meet the criteria of: (a) admission age 5-6 to 7, (b) child's and parents' regular attendance, (c) parental agreement and ability to participate in the treatment program, and (d) basic home stability. These criteria resulted in a socioeconomic selectiveness and relatively small middle class families made up the bulk of the population.

Procedure: The program consisted of three years of combined psychiatric, psychological, casework, and special education services. Parents received group and/or individual treatment, and after the child graduated from the three year school, the family remained in after care treatment for another year with consultation offered for a five year period after treatment terminated.

Results: Using the criteria of the child's ability to function in a school after previous exclusion, as well as clinical impressions and test scores, 76 percent of the results were adjudged "good" and 24 percent "unsatisfactory." The latter figure includes 11 percent requiring residential treatment after completion of the program.

There was no significant increase in IQ for the group. Although many children diagnosed as schizophrenic were able to return to community schools, the diagnosis and essential symptomatology did not change.

Day treatment was seen as an effective alternative to residential treatment except in those cases where parental pathology was so powerful as to undo even the most intensive therapeutic effort.

Comment: The absence of appropriate controls makes it impossible to ascertain the relative effectiveness of the treatment program. However, the description of treatment spells out professional roles and explicates the rationale for the program.

Kounin, J. S., Friesen, W. V., and Norton, A. Evangeline. Managing Emotionally Disturbed Children in Regular Classrooms. *Journal of Educational Psychology*, 1966, *57*, 1-13.

Purpose: To identify various dimensions of teaching style which might be related to the behavior of disturbed children in regular classrooms.

Subjects: Fifteen classes from grades 1 and 2, and 15 from grades 3 through 5, each typically containing one or more children earlier diagnosed as emotionally disturbed.

Procedure: Half-day samples of classes were videotaped, with special camera attention to the disturbed children and the teacher. Tapes were coded, and the current report discussed two child behavior codes, work involvement and deviancy rate, as well as a number of codes relating to teacher behavior.

Results: Behavior of nondisturbed children, measured in a variety of settings, was more school appropriate than that of disturbed subjects on both work involvement and degree of deviancy. The behavior of all children varied with the classroom setting, being most appropriate in subgroup recitation and lowest in seatwork situations. The degree of school appropriate behavior of nondisturbed children was directly related to that of disturbed children, which in turn was related to teaching style. Teachers who managed surface behavior of disturbed children "produced a climate" which lowered the rate of contagion to others in the class. "Desisting" style of teachers (dealing with misbehavior as such) was unrelated to the rate of child misbehavior. Teacher "with-it-ness" (the degree to which the teacher was able to communicate to the children that she knew what was going on in the class) was positively related to work involvement and negatively to deviancy. This was also the case for teacher smoothness in transition from one variety of activity to another. The duration of particular activities was unrelated to the criteria. In general, effectiveness in managing classroom misbehavior by teachers was the same for disturbed and nondisturbed children.

Comment: A particular value of this study lies in its delineation of specific teacher behaviors which may be directly associated with the manageability of pupils' misbehavior. The possibility is raised that teacher behavior, in its own right, may represent a source of information about "treatment" approaches. Further, it indicates that some deviant behavior may be adventitiously brought under control by adequate teacher management techniques. The study nicely exemplifies the utility of newer technology in educational research.

Morse, W. C., Cutler, R. L., and Fink, A. H. *Public School Classes for the Emotionally Handicapped: A Research Analysis.* Washington: Council for Exceptional Children, 1964.

Purpose: To describe and evaluate special class programs for emotionally disturbed children on a nationwide basis.

Subjects: Fifty-four programs, which included 74 classrooms and more than 500 children.

Procedure: The following data were collected: descriptions of programs by administrators; pupil perceptions—past, present, and future; data from teachers regarding both methods and pupils; and ratings of teacher and pupil behaviors by site visitors.

Results: Most programs are relatively new, and admittedly insufficient. They were categorized into seven types: Psychiatric dynamic, psychoeducational, psychological behavioral, educational, naturalistic, primitive, and chaotic. Pupil perceptions of their own improvement, level of school anxiety, teachers' perception of children, and reported change in pupil behavior varied significantly according to type of program. A psychoeducational type program was typically superior in these regards.

Most classes had 5 to 9 students, with a maximum of 19. The mean age of pupils was between 9 and 10, and 83 percent were boys. IQ's were negatively skewed; reading retardation while evident was not as dramatic as is typically reported. Twenty-six percent of the children were receiving conjunctive psychotherapy; 60 percent had been diagnosed as neurotic, and 16 percent "primitive neglected." The most frequently observed behavior problems, as viewed by teachers, were: lacking self confidence, inability to concentrate, being in need of prodding, feeling inferior, having poor self control, and being argumentative. Pupils were most inclined to believe they had been assigned to a special class first because of behavior and secondly because of achievement problems. Students were likely to see their major problem in special class as academic, while teachers viewed management and control as their major problems.

Site visitors rated 46 percent of the teachers as seeing their pupils from an educational viewpoint, and rated 45 percent of the teachers as applying an academic emphasis, while 7 percent were considered to have an "intense therapeutic" emphasis. Teachers were rated as to their control style, with 38 percent appearing tolerant or patient, 16 percent using rigid control methods, and 13 percent controlling "to please adults."

Ratings of program success by site visitors were generally more positive than ratings of school personnel. Teachers saw their major successes as a function of social or academic adjustment, while explanations of failures were more variable. Participation in therapy apparently improved pupils' classroom self concepts, but yielded no differences in teacher judgments.

Comment: One value of this data rich but cautiously interpreted study lies in opening up areas for much important further research. Especially worthwhile is the categorization of different program styles, and the evident effects such differences yield.

Shore, M., and Massimo, J. Comprehensive Vocationally Oriented Psychotherapy for Adolescent Delinquent Boys: A Follow Up Study. *American Journal of Orthopsychiatry*, 1966, *36*, 609-615.

Purpose: A followup study to determine how effective a program of vocationally oriented psychotherapy was in accomplishing changes which could be maintained or continued after treatment had ceased.

Subjects: Twenty adolescent boys with records of antisocial activity. Subjects were 15-17, of normal IQ, and had either been suspended or voluntarily left school because of (according to the school) poor school performance combined with antisocial behavior. Subjects did not exhibit any gross psychosis, and had no previous therapy.

Procedure: Two groups were randomly formed—treatment and nontreatment. The treatment approach combined remedial education and psychotherapy within the context of job placement. Achievement and thematic tests were administered and a work history compiled for both groups.

Results: Subjects in the treatment group showed significant gains while most controls showed deterioration.

Comment: This study is superior to others of its genre in its use of a "blind" approach to judgment of records and because a followup was included, suggesting that gains may not have been transitory or experimental artifacts. It also provides evidence that success with chronic antisocial subjects can be accomplished.

Hewett, F. M., Mayhew, D., and Rabb, Ethel. An Experimental Reading Program for Neurologically Impaired, Mentally Retarded, and Severely Emotionally Disturbed Children. *American Journal of Orthopsychiatry*, 1967, *37*, 35-48.

Purpose: To develop a reading program for exceptional children which prepares the child while he actually learns to read.

Subjects: Four groups of children were included: neurologically impaired, educable mentally retarded, emotionally disturbed, and autistic.

Procedure: A standard program utilizing empirical learning theory and reinforcement principles was developed, using programed materials. Of particular relevance was the development of "errorless training" for both the autistic children and those who could not achieve a 75 percent correct response in the standard reading program. Rewards were first given on a continuous basis (1:1) and then the reinforcement schedule gradually changed.

Results: Subjects were able to learn some reading skills. The emotionally disturbed, neurologically impaired, and educable mentally retarded subjects generally did not require extensive errorless training and were able to move directly into the standard program. While many subjects began as word callers, the authors report they gained understanding of the material.

Comment: "Errorless training" may eventually prove quite useful in teaching severely disturbed children who have been excluded from any kind of schooling. It may some day be possible to develop at least minimal reading programs for some severely disturbed children without psychotherapy or complex "readiness" programs.

In Review

More attention has recently been paid to controlled studies than heretofore; criterion measures for effective treatment are increasingly being explicated. Longitudinal evidence is particularly sparse, and control groups are lacking in many studies.

SUMMARY

The burgeoning of interest in behaviorally disordered children has been reflected in the proliferation of both programs and research. To some limited degree, the effects of good research are being reflected in programs themselves. Typically, however, programs "just grow" without necessary comparability as to objectives or membership. Criteria relating to programatic goals, evidence of change, and bases for inclusion need to be more clearly defined. As a result of confusion about bases for inclusion, the prevalence rates of general or specific conditions are not known. Consequently, program planning inevitably suffers. Some progress has been made in assessing the relative merits of different program styles to the extent that these lend themselves to objective scrutiny. Because criteria of pupil change have not been adequately defined, little is really understood about program effectiveness.

Researchers continue to seek understanding of various childhood behavioral disorders. There is an apparent swing towards organizing such explanations around a psychophysiological or sometimes "interactionist" base, especially with regard to the more severe conditions. Some salutary effects of this movement may be anticipated, including possible rapprochements with workers primarily identified with mental retardation and increased understanding of the ineffectiveness of some types of behavioral intervention. Shifts to physiological explanations are part of a more general, but hardly pervasive, move away from the traditional psychodynamic approaches to theory and treatment. A concomitant effect is that new behavioral theory has not filled the breach. Much research in the field is descriptive and/or atheoretical.

Atheoretical research has often been pragmatically useful. However, it has contributed to difficulties in defining appropriate criteria, since necessary schemas for organizing new information are lacking. Good theory is needed as a guide to objectives *other than* the absence of pathology.

An exciting development has been the growing interest of professionals in applications of conditioning theory to problems in the field. The effects of this development are being felt directly in the classroom as well as in the clinic; there is a merging of these contexts under a single rubric, whether that is termed "treatment," "remediation," or "behavior modification." A danger lies in viewing these approaches as panaceas, which few proponents claim them to be. One should recall the overreactions resulting from the failure of Thorndikian theory or notions on transfer of training to "fit" classroom practices.

There is a clear trend toward increased reliance on treatment methods that utilize the new technology of reinforcement principles and automated classrooms and the old technology of reeducation. Evidence regarding the effectiveness of other approaches to intervention, such as analytically or psychodynamically based psychotherapies, is lacking. When intervention along the medical model has been possible, it appears to have been typically applied in the schools to those cases with the best prognosis.

The conclusions that can be reached on the basis of current research in the field of behavioral disorders are quite tenuous. Longitudinal evidence for the effectiveness of intervention programs is lacking. A number of intervention approaches do appear to be ineffective, however.

New methodology has emerged in our quest for knowledge. Much of the current research has had the salubrious effect of clearing away erroneous or unprovable assumptions, thereby fostering growth of more scientific bases for genuine progress in the field.

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9

Administration

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The purpose of this chapter is to review the research literature which relates to the problems of organizing, administering, and supervising special education programs. It is interesting to note that reviews of the research in administration often begin with a discussion of the sparsity of specific research studies and conclude with an appeal for more research (Voelker and Mullen, 1963; Howe, 1966; Willenberg, 1966).

There are a number of reasons why the fund of knowledge about administrative problems in special education is limited. Chief among these is the fact that "administrative research" has not yet been clearly defined. There is still no clear theoretical basis for the administration of special education at the federal, state, and local levels (Willenberg, 1966). Thus, researchers lack a theoretical base of departure for organized research in this problem area.

The overlap and interrelatedness of administrative problems in special education is a second factor which has probably limited research efforts. Administrators at the local, county, state, regional, and national levels are all confronted with many of the same kinds of administrative problems, which cut across a variety of different disciplines. The end result has been that no professional group or organization has fully accepted the responsibility or taken the initiative for conducting administrative research in special education.

A third reason is that problems of an administrative nature have received a lower research priority than the description of cognitive, emotional, physical, and academic characteristics, test construction, and development of teaching techniques. In addition, the growth in the number of handicapped children served and the number of school systems providing services has been over 200 percent from 1948 to 1963 (Mackie, 1965). This increase has absorbed much of the time and attention of administrators, leaving little time for research activities.

A fourth factor is that the average administrator has received little or no training in research design or techniques. In studying the training of supervisors and directors of special education programs, Milazzo and Blessing (1964) mention that future directors and supervisors should be prepared to conduct research. A cursory examination of curricula for training administrators, however, reveals that the curriculum provides little or no opportunity for training in research techniques. This deficiency was also highlighted in a study by Wisland and Vaughan (1964) which revealed the concern of administrators and supervisors with their own inability to carry out needed research.

Despite these limiting factors, there is some literature on administrative practices in special education concerned with finding methods to deal with various kinds of problems. For example, many school districts and state offices of education have gathered data and conducted self studies for planning purposes. Unfortunately, the vast majority of these reports and studies have not been published, frequently appearing in mimeographed form only. There is no specific journal or organization which systematically compiles and publishes information about administrative research in special education, so the interested reader must conduct a wide literature search.

This chapter includes representative examples of the kinds of research related to administrative problems in special education. For purposes of organization the chapter is divided into four sections: (a) descriptive reports, (b) normative data and correlation studies, (c) program evaluation studies, and (d) directions for future research.

It is suggested that the reader give consideration to the kinds of questions asked by researchers and the methods and procedures employed, as well as the results obtained. It may be even more important to consider the questions in administrative research which have not yet been asked, and the research approaches and techniques which have yet to be applied.

DESCRIPTIVE REPORTS

The first level of research in a new problem area is that of description. In the area of administration, descriptive reports usually provide an account of how administrative units have attempted to resolve organizational, supervisory, or administrative problems. This kind of reporting has value as a source of information, new ideas, and approaches. The descriptive report also provides a documented "administrative case study" which may be compared to the individual case study approach. Conference reports and research monographs which focus on problem areas provide clarification of issues, present innovative alternatives, and provide administrative direction.

Ling, Barbara, and Simonson, E. H. *The Challenge of the Highly Gifted: How It Was Met in Summit County Schools.* Columbus, Ohio: Columbus Blank Book Company, 1965.

Purpose: To establish a demonstration project designed to meet the educational needs of highly gifted children and to provide a dynamic action research laboratory where the children could be studied in terms of the modification of the usual classroom techniques.

Subjects: Twenty-one pupils, 9 boys and 12 girls, from the 1961-1962 fourth grade group, were selected for the project on the basis of teacher judgment, test results (Binet IQ range 140-173), and parental interviews.

Procedure: The Summit County Superintendent and his staff initiated the plans for the creation of a centralized county wide unit of high potential children with 140 IQ and above. A two year experimental program was approved by the State Department of Education, Division of Special Education, from funds appropriated by the legislature for research on the gifted. The grant provided money for teachers' salaries, instructional equipment, and teaching materials. The cost of transporting pupils to a centrally located school was met by local boards.

Results: The report discusses supervisory arrangements for the study—selection of site, teacher selection criteria, policies governing admission and withdrawals, equipment and materials, and transportation arrangements. The report also includes a process for screening pupils and the management of individual parental conferences, as well as a curriculum outline. Reactions of the pupils, parents, and educators at the beginning, middle, and conclusion of the project are reported.

Mahler, D. *Instructional Planning for Educationally Handicapped Children.* Orinda, California: Orinda Union School District, 1964.

Purpose: To report the operational aspects of programs for the educationally handicapped in a public elementary school district setting, and to provide information to other California schools anticipating initiation of such programs.

Procedure: The Orinda Union School District received authorization from the California State Department of Education to establish special classes, on a research basis, for neurologically handicapped children with behavioral and/or learning difficulties.

Results: The report discusses major administrative considerations such as preprogram planning, administration and coordination, primary services, county schools' office services, county teacher selection assignment, teacher preparation and licensing, and the role of teaching assistants. Also included is information regarding pupil selection, initial screening, admissions criteria, diagnostic evaluative services, pupil assignment, parental relations, and cost. Suggestions and considerations for teachers who work with the educationally handicapped are also discussed, as well as curriculum considerations, physical considerations, and grouping.

Lord, F. E., and Isenberg, R. M. (Editors) *Cooperative Programs in Special Education*. Washington: The Council for Exceptional Children and the Department of Rural Education, National Education Association, 1964.

Purpose: To describe some representative approaches now being used in the United States for the development of cooperative interdistrict planning of special education programs.

Procedure: A monograph was prepared describing various approaches to the development of cooperative area programs by combining resources of two or more school districts unable to support special education programs on an individual basis. No attempt was made to deal with the merits or to evaluate the effectiveness of these approaches.

Results: This monograph describes (a) the problems of providing services for exceptional children in the public schools and (b) several different approaches for organizing special education programs in sparsely populated areas or small school districts. Included are contracting for state wide approaches to service operations, forming cooperative units, organizing special education districts, and developing effective intermediate units. Certain unique statewide and local plans are described such as (a) the Joint Agreement program in Illinois, (b) the County Intermediate School Districts in Michigan, (c) the cooperative programs in California, (d) the Boards of Cooperative Educational Services in New York, (e) the Special District in St. Louis, Missouri, and (f) Iowa's Multicounty Unit Plan.

Reynolds, M. C. (Editor) ***Early School Admission for Mentally Advanced Children: A Review of Research and Practice.*** **Washington: The Council for Exceptional Children, 1962.**

Purpose: To summarize research related to flexible school admission procedures and to describe the practices of a number of communities which grant early admission to bright and gifted pupils.

Procedure: This bulletin was prepared by a number of contributing authors.

Results: This review of research on early admission revealed that early admission to school of mentally advanced children, who are within a year of the ordinary school entrance age and who are generally mature, is advantageous for them. Four chapters in the book offer a practical guide to school officials with respect to early school admission. These include: the Brookline, Massachusetts, program of early admission to kindergarten; the early admission program in Evanston, Illinois; the early admission program in Minneapolis, Minnesota; and a discussion of 12 years of early admission in Nebraska. The problems of establishing workable programs of early admission are discussed, and the importance of including systematic evaluation in launching an early admission program is stressed. Information on community background, history of the program, operating policies, and procedures for evaluation are also included. The monograph contains information which would be helpful for the administrator in a large city system, a small city, or a suburban community, and it also describes a successful program throughout a state.

Schuchat, T. (Editor) ***Creative Use of Federal Legislation for Exceptional Children.*** **Washington: Council for Exceptional Children, 1965.**

Purpose: (a) To provide a sound working knowledge of existing legislation, (b) to identify aspects of these laws and programs that present problems to the field of special education, (c) to assess further needs for improvement in the education of exceptional children, and (d) to stimulate development and adoption of creative innovations in special education.

Procedure: The initial session of the conference consisted of a review of recent enactments and new programs presented by officials of Congress, the Department of Health, Education, and Welfare, and the US Office of Education. Each participant then attended two special interest sessions, the first organized by educational setting and the second according to area of exceptionality. The small group sessions were structured to elicit discussion and reactions to these questions: (a) What imaginative ideas involving federal support are currently employed in your setting? (b) What are some of the concerns and activities not feasible under present legislation? and (c) What further legislation should be adopted for the education of exceptional children? The conference concluded with a general session seminar and clinic which provided additional opportunities for asking and answering questions.

Results: The conference resulted in a report which provides useful information about federal legislation for exceptional children, and which has stimulated interaction among local, state, and federal officials. Many administrative problems were identified and discussed. In some instances, specific recommendations were made for resolving these problems (a) through action programs, (b) by taking advantage of existing federal legislation, and (c) by recommending modifications in existing laws or the enactment of new legislation.

Jordan, June B. (Editor) *Special Education Services in Sparsely Populated Areas: Guidelines for Research.* Boulder, Colorado: The Montana State Department of Public Instruction and the Western Interstate Commission for Higher Education, 1966.

Purpose: To delineate research problems in providing programs for exceptional children in sparsely populated areas and to stimulate future research.

Procedure: The Montana State Department of Public Instruction and the Western Interstate Commission for Higher Education, with financial assistance from the US Office of Education, the Vocational Rehabilitation Administration, and the United Cerebral Palsy Research and Education Foundation, Inc., sponsored a National Research Conference on Special Education Services in Sparsely Populated Areas. Forty-seven participants representing research, administration, and education convened in Denver in March, 1966. During the general session of the conference, presentations were made in the specific topic areas of administrative organization, financial patterns, personnel, and supportive services. Participants then reported to one of the four topic area working groups. Position papers identifying research problems were developed.

Results: The monograph resulting from this working conference points out the futility in attempting to transplant effective administrative patterns of urban areas for use in less populous areas, and the need to find new and successful ideas in providing special education programs in rural areas. Specific research questions are delineated in the areas of administrative organization, financial support, personnel, and supportive services. Guidelines are suggested for conducting cooperative research studies which encompass wide geographic areas and various political and educational groups.

Mooring, Ivy P., and Currie, R. J. A Conceptualized Model for Community Services for the Mentally Retarded. *Exceptional Children,* 1964, *30,* 202-205.

Purpose: To create an effective model for community services which would improve planning development and coordination of services for the mentally retarded in Los Angeles County.

Procedure: In order to accomplish this objective, the Mental Retardation Joint Agencies Project was created in Los Angeles County. The first step was to assess the services for mentally retarded children in Los Angeles County in terms of completeness, balance, economy, and interagency cooperation. The second step was the signing of a Joint Powers Agreement by the agencies providing the services. As a third step, the Mental Retardation Services Board was established under the legal authority of a Joint Powers Agreement. The Board was responsible for providing staff and facilities to achieve the objectives of the agreements.

Results: It is hoped that the establishment of such a model for community services will provide a sound organizational basis for the most efficient and effective use of available resources for the retarded population.

Taylor, H. O., and Olsen, Katherine. Team Teaching with Trainable Mentally Retarded Children. *Exceptional Children,* 1964, *30,* 304-309.

Purpose: To investigate the effectiveness of team teaching at the Slover Special School in Fontana, California.

Procedure: The project was initiated with a six month study and discussion. Written reports from the Harvard and Claremont team teaching projects were studied, and elementary schools were visited.

The change to team teaching at Slover was made without financial or major administrative changes because the staff was already organized under its teaching assistant principal who could function as the team leader, and because classroom assistants who could serve as teacher aides had already been employed.

Results: The project identified a number of recommendations which have relevance for organizing teaching teams in elementary schools: (a) there should be a clearly identifiable group of students who will work with the team; (b) the team should be composed of four to six teachers whose talents and specializations complement one another; (c) each faculty team should have an elected or appointed leader to coordinate the team's efforts; (d) each team should have a teacher aide, a noncertified person from the community to work with the team on a part time basis; (e) each team should develop a roster of citizens with special talents who could assist in specific aspects of the instructional program or could lead student study groups.

After three years of evolving use of the team teaching method at Slover, there was unanimous agreement that this method gives greater flexibility to everyone involved—students, teaching staff, administrators, parents, and community members. The team method was found to change the relationship between teacher and teacher, student and teacher, teacher and administrator, and parents and teacher.

CONCLUSIONS

Descriptive reports contained in the literature seem to fall into two categories. The first category is the administrative case study approach in which a school system, institution, or a state describes how a particular problem was studied and resolved. Because many of these reports evolved from experiences accrued over a number of years, evaluative measures, when employed, were frequently not applied until late in the development of the program.

The administrative case study usually touches upon a large number of complex problem areas. These include statements of philosophy and policies upon which the program is based. Descriptions of various administrative practices are included, such as screening and individual testing procedures for identification, selection, and placement of pupils; criteria for teacher selection; supervisory practices; parental contact; transportation arrangements for pupils; equipment and materials; and financial support. It would be helpful if descriptive studies focused on the interrelationship of variables and included more detailed information.

Many reports include descriptions of how administrative problems which related to a particular kind of exceptionality—such as deafness, retardedness, or giftedness—were met. There is need to interrelate different kinds of programs and services for exceptional children. The administrator is in a strategic position for initiating planning and submitting recommendations for decisions and, therefore, is the logical person to study the mobilization of community, school, and state resources.

A second approach is the use of conference reports and research monographs. The monograph may be prepared by a number of contributing authors who focus on different aspects of the same problem area, such as early admission for mentally advanced children or the organization of cooperative programs in special education. Informative monographs also result from working conferences. The Council for Exceptional Children, for example, conducted a working conference on the creative use of federal legislation for exceptional children. The resulting monograph contains a considerable amount of information for the administrator, legislative provisions for research and demonstration projects, and the innovative uses of federal funds. The conference can also be used to focus upon a specific problem. The Montana State Department of Public Instruction and the Western Interstate Commission for Higher Education's conference resulted in a specific list of research studies and action programs which should be initiated to study and resolve administrative problems in sparsely populated areas.

NORMATIVE DATA AND CORRELATIONAL STUDIES

The need for normative data and correlational studies in the field of special education is critical. If local boards of education, state legislatures, and Congress are to be expected to continue supporting and improving services and facilities for exceptional children, administrators must be able to provide reliable data as justification for expanded programs and expenditures. Accurate data are also needed by the administrator as a sound and objective basis for planning and projecting program needs. Correlational studies seek to identify relationships between two or more variables and call attention to factors which differentiate one situation from others. When relationships have been established, it is then possible to develop procedures for modification and intervention, and study the resultant effects.

Grover, E. C. *Ohio Programs for Visually Handicapped Children. A Report on the 1964-1965 Columbus, Ohio Study of Partially Seeing.* Columbus, Ohio: Ohio Department of Education, 1965.

Purpose: To determine the actual prevalence of partially seeing children in the city of Columbus, to determine the educational needs of children in this category, and to identify possible changes in the types of services now offered to these children.

Subjects: A total of 102,193 children, K through 12 in the Columbus public schools, screened for visual handicaps.

Procedure: This project was studied through a cooperative effort between the Columbus Board of Education, the Division of Special Education, Ohio Department of Education, and the Division of Maternal and Child Health, Ohio Department of Health. Visual screening was conducted on all fourth, fifth, and sixth grade children throughout the Columbus public schools. Children identified as partially seeing were given complete evaluations: ophthalmological, optometric, medical (pediatric, neurological, EEG), psychological, and achievement. Children identified as partially seeing had an IQ of 70 or above and met one or both of the Ohio Department of Education's Visual Standards of Partially Seeing Children: (a) visual acuity of 20/70 or less in the better eye after correction, and (b) a correction of more than 10 diopters of myopia.

Results: A total of 23,611 children were examined and of these, 214 were referred for followup by specialists. Permission for further examination was obtained from the parents of 168 children. When ophthalmological and optometric examinations were completed, it was found that 36 children met the preselected criteria for partially seeing and were therefore included for pediatric, neurological, electroencephalographic and psychological examinations. This sample consisted of nine children from regular classes, 21 from classes for the partially seeing, and six from classes for slow learning visually handicapped. Results obtained suggest a prevalence figure between .15 percent and .2 percent, which compares with national findings when using the 20/70 criteria and 10 or more diopters of myopia. Results based solely upon the 20/70 or less criteria would suggest a prevalence figure of .13 percent.

Edwards, Stella A. *Status Report, Kentucky's Public Schools.* Frankfort, Kentucky: Kentucky Department of Education, Division of Special Education, 1965.

Purpose: To gather data concerned with Kentucky's special education program for exceptional children.

Procedure: This report was prepared by the Division of Special Education, state of Kentucky.

Results: Included is a history of special education in the state of Kentucky since 1948, summaries of the important special education acts, their amendments, and data on the growth in the number of exceptional children units as related to the implementation of the foundation program law. The functions and services of the Division of Special Education are described, and the scope of the educational program for exceptional children in Kentucky is presented from a consideration of the number of classroom units in the school districts in which these units are located. In 1955-1956, 99.3 classroom units were provided for exceptional children; by 1964-1965, this number had increased to 424.0 units, a gain of 327 percent. For the most part, the greatest increase was in the area of classes for mentally retarded children. Prior to 1956-1957, no public school classes were held for trainable mentally retarded, but action of the general assembly in 1956 authorized public school districts to provide services for these children. The total average daily membership of pupils in classroom units for exceptional children increased from 665.11 in 1948-1949 to 5,302.4 in 1964-1965. During that same period, speech correction programs increased from 215 in 1948-1949 to 4,634 for 1964-1965. A comparison between the total number of units needed for handicapped children and the total number provided revealed that approximately 17.3 percent of the need is being met by the Kentucky public schools.

Mackie, Romaine P. Spotlighting Advances in Special Education. *Exceptional Children,* 1965, *32,* 77-81.

Purpose: To report quantitive advances in the local public school systems which offer special education programs, in enrollment of pupils by type of exceptionality, and in number of special teachers and speech and hearing specialists.

Procedure: The Office of Education surveyed all public school systems in the United States, all school programs in public hospitals for the mentally ill, and all known public and private residential schools for the blind, deaf, mentally retarded, and emotionally disturbed and socially maladjusted, including the delinquent. Nonpublic day schools were not included. The survey was conducted in 1963 and the findings were compared with the results of the 1948 and 1958 surveys.

Results: The survey showed that about 5,600 school systems had special programs in 1963. This represents an increase of about 2,000 local school systems since 1958, and more than 4,000 since 1948. As many as 8,000 additional school systems probably arranged for the instruction of some or all of their exceptional children through cooperation with other school districts. Pupil enrollment in 1963 was approximately 1,666,000. This represents an increase of approximately 280 percent since 1948, whereas the total school age population increased only 63 percent. In 1963, about 27 percent of the estimated 6.1 million school age children requiring some form of special education were actually receiving services. Fifteen years earlier, only 12 percent of an estimated 3.8 million children needing special help were receiving it. Wide variation of the percentage of children requiring special education in relation to those receiving it was found from one area of exceptionality to another. The percentage increase was highest in the areas of the blind and the gifted. Services for gifted children increased nearly 300 percent. Nursery school and kindergarten programs were found to be developing at a very rapid rate. Public day schools reported about 33,000 exceptional children in kindergarten and nursery school programs. Enrollment in residential schools for the emotionally disturbed and socially maladjusted and for the mentally retarded showed an increase of about 80 percent, while enrollments of blind and deaf children in residential schools were much less percentage wise. The largest proportion of emotionally disturbed and socially maladjusted, blind, and deaf children in special education were in residential programs. The largest numbers of mentally retarded children in special education were reported to be in day school programs. Since 1948, the greatest percentage increase in special educators in public schools has taken place in the areas of the gifted and the speech impaired. The largest increase in residential school staff was in the areas of emotionally and socially maladjusted and the mentally retarded. During the years 1948 to 1963, the teaching force increased roughly 350 percent.

Gottfried, N. W., and Jones, R. L. Career Choice Factors in Special Education. *Exceptional Children,* 1964, *30,* 218-223.

Purpose: To identify background and motivational personality factors associated with career choice and career satisfaction in special education.

Subjects: One hundred forty-nine undergraduate students representing six areas of specialization (crippled, deaf, blind, speech handicapped, educable mentally retarded, and socially emotionally disturbed) in one college during the regular academic year.

Procedure: A one page questionnaire, distributed by instructors, was completed by students at their convenience outside the classroom. Items included major areas of special education and preferred age group, previous contacts with exceptional children, approximate date of career choice, courses completed, and reasons influencing decisions to enter special education. Responses were tabulated and reported for each field of interest.

Results: The results indicated that direct work experience with exceptional children and contact with professional workers are the most important antecedents to the selection of a career in special education. This suggests that volunteers and paid participation of high school students should be made an integral part of every special education program in each community. The most frequently reported motives for entering the field were the desire to help others and the challenge presented. There is need to gain better understanding of the relationship between motivational patterns, career choice, and career satisfaction.

Chalfant, J. C. Factors Related to Special Education Services. *Council for Exceptional Children Monograph Series B*, 1967, No. B-3.

Purpose: To determine the nature of economic and demographic factors which underlie public school provisions for exceptional children in Illinois counties, and to develop a diagnostic technique to indicate whether or not counties could be expected to provide special education services.

Procedure: The provision of special education services in 101 of Illinois' 102 counties was studied in relation to 31 demographic and economic characteristics presumed to be related to the presence or absence of these services. The five special education services included classes for deaf, speech correction, elementary and secondary classes for educable mentally handicapped, and the services of a director of special education. Multiple regression and factor analytic techniques were used to determine the relative strength of economic and demographic variables in predicting the proportion of children per county receiving special education services for each area of exceptionality studied.

Results: Six factors were generated by the factor analysis: urban, education, socioeconomic status, rural occupations, financial ability and population growth. In most instances, knowledge of the factor scores for each county tended to help explain why special education services were or were not provided in those counties. Also, four patterns or combinations of factor loadings were identified which were related to the presence or absence of special services. In a few counties, however, factor scores did not help explain why services were or were not provided. By studying these counties in depth, several additional variables were identified. For example, (a) the Joint agreement plan for providing cooperative programs, (b) accessibility to large metropolitan center, and (c) the presence of university teacher training programs, were found to have an impact on whether or not public schools provided services. Knowledge of the factor scores for each county provided an administrative differential diagnosis of the factor assets or deficits which might contribute to the presence or absence of special services. Therefore, the five factor scores were used to develop a Special Education Expectancy Index for each special service studied. The Index provides an instrument which helps to (a) predict the likelihood of counties to provide special education services, and (b) compare the effort of counties or states of approximately the same potential ability to support services. The Index is constructed so that any state can use its own standards and regulations to identify high or low expectancy counties for what is typical or atypical for that particular state.

CONCLUSIONS

In the past, administrators at the local, county, state, and federal levels have conducted statistical studies for purposes of program planning and justification for additional personnel, facilities, or financial support. The purposes of the studies and the resources for research activity determine the kinds of data collected and the procedures by which they were gathered. The kinds of data collected typically include such items as characteristics and prevalence of exceptional children and youth; kinds of services and facilities which are available; the extent to which educational needs are being met; information concerning the recruitment, training, placement, and retention of personnel; expenditures required for program support; and indications of program growth and development.

There are several reasons why it is difficult to compare or add data from different school districts, counties, or states. Criteria for inclusion in a prevalence study, for example, may differ from one study to the next. Differences between studies include age range of the subjects; boy girl ratio; inclusion of private, public, and residential school populations; economic and demographic characteristics; sample size; and the procedures used to identify and diagnose the exceptional children in question. All contribute to the difficulty of compiling or adding data from diverse sources.

National survey procedures, for the most part, have been limited to the survey questionnaire. The major deficiency of the questionnaire is that it is entirely dependent upon the data collection and reporting procedures of thousands of administrative units. States which have well developed special education programs usually conduct special education census studies on a systematic basis. States which lack well developed programs for exceptional children find it difficult to conduct accurate surveys. There is need to launch both national and statewide prevalence studies which are designed to gather the same kinds of information in the same controlled way.

There is need to investigate, through correlational studies, the interrelationships of the many variables with which administrators must be concerned. It is necessary to establish the significance of various factors with respect to their influence upon program operation. With the advent of the computer, it is now possible to investigate complex interrelationships as well as to streamline centuries old processes of census taking. Universities and colleges can provide expertise in the areas of school finance, economics, and demography, and can be of great assistance in developing normative data and correlational studies. State departments of education, in cooperation with organizations such as the Southern Regional Educational Board and the Western Interstate Commission for Higher Education, can institute state and regional studies.

PROGRAM EVALUATION STUDIES

The program evaluation study goes beyond the descriptive report, and offers an objective procedure for investigating the administrative effectiveness, efficiency, and appropriateness of strategies for problem solving. Another distinguishing feature of the evaluative study is that specific objectives and assessment procedures are usually selected beforehand.

Deno, Evelyn, Henze, R., Krantz, G., and Barklind, K. *Retarded Youth: Their School-Rehabilitation Needs.* Research and Demonstration Project 681. Washington: Vocational Rehabilitation Administration, Department of Health, Education, and Welfare, 1965.

Purpose: To demonstrate and evaluate the types of program and training facilities which could be established within a public school framework for effectively preparing adolescent retarded high school students for employment and community responsibility.

Subjects: Five hundred mentally retarded students enrolled in the Minneapolis Public Schools and served by the demonstration unit from September, 1960, through August, 1964.

Procedure: In November, 1960, a research and demonstration grant was awarded to the Minneapolis school district by the Office of Vocational Rehabilitation. The Minnesota Division of Vocational Rehabilitation and a Community Advisory Board, whose membership represented many community resources for work with the retarded, also assisted in the development of this project. The project was directed toward the task of supplying information for planning purposes and devising more effective and efficient ways of achieving vocational adjustment for the retarded. In addition, some 400 former special class students who had left school during the three year period immediately preceding the project were located and interviewed. The primary purpose of this aspect of the study was to evaluate and demonstrate effective services, as well as to study basic problems and propose solutions for them.

Results: The report describes how the project was organized, staffed, developed, and coordinated with the agencies and resources of the community. The project also involved a series of substudies which assisted in evaluating the project. A followup study of former special class students revealed that almost half of the subjects were holding full time jobs, were in the armed services, or were housewives. A study of retarded students assigned to the Minneapolis Vocational High School and Technical Institute found that the rate of survival in trade school training was so low as to render questionable the appropriateness of this kind of training for the retarded. This project has implications for the provision of vocational services for retarded individuals, training facilities, and placement procedures as part of the developmental adjustment and training process.

Harvey, J., McMillan, F. M., Ebersole, L. E. ***Special Class Curriculum and Environment and Vocational Rehabilitation of Mentally Retarded Young Adults.*** **University, Alabama: University of Alabama, 1964.**

Purpose: To demonstrate how cooperative agencies might assist in an organized program for the terminal education and rehabilitation of the mentally retarded; to develop curricula for the mentally retarded young adult; to develop a procedure which would be useful to the vocational rehabilitation counselor to identify factors which seem to contribute to success or failure in selection, training, and placement of mentally retarded young adults; and to systematically follow up clients who had been placed in order to assess the effectiveness of the program.

Subjects: Two hundred nine mentally retarded young adults (CA range of 15 to 21) who on the basis of a Stanford-Binet or Wechsler had been diagnosed as educable, as defined by the Alabama State Plan.

Procedure: A series of research and demonstration project classes were chosen as the best possible approach to extending school programs for mentally retarded young adults in Alabama. Ten project classes were initiated in areas with existing rehabilitation facilities; each pupil client's participation in the project was in a special class workshop setting within a rehabilitation facility. The method used in this project was not construed as a way of relieving the local public school systems of the responsibility for providing a terminal program, but as a feasible approach to community and state cooperation for meeting academic and rehabilitation needs.

Results: Of the 209 pupil clients included within the project, 62 were rehabilitated through Alabama Vocational Rehabilitation Service; 13 rehabilitated through other means; 24 were receiving aid in adjustment, on the job vocational training, or were in sheltered employment; 7 were working part time; 3 females were married; 44 were continued in classes for 1964-65; and 56 were considered nonrehabilitated. Final reports indicated that 20 clients were dropped by dismissal committees for 18 different reasons. Pupil clients were placed in 52 different kinds of jobs. Significant in those placements was the team approach with mutual understanding, respect, and appreciation among teachers, rehabilitation personnel, and workshop personnel. Equally significant was the curriculum, which considered the rehabilitation processes as integral and inseparable in the development of procedures for admission, dismissal, evaluation, job training placement, counseling, and record keeping.

Weaver, J. B., and Wollensheem, Janet P. ***A Pilot Study Comparing the Block System and the Intermittent System of Scheduling Speech Correction Cases in the Public Schools.*** **Champaign, Illinois: Champaign Community Unit 4 Schools, Department of Special Services, 1963.**

Purpose: To compare the effectiveness of the block system (daily therapy for several weeks) with the intermittent system (therapy twice a week over a longer period). It was hypothesized that children with articulation problems receiving speech correction under the block system would make significantly greater gains than those receiving speech correction under the intermittent system.

Subjects: One thousand seven hundred children from 13 elementary schools were screened by speech correctionists; those with articulation problems and normal intelligence were included. The block and intermittent groups were composed of comparable proportions of rural; Negro; and upper, middle, and lower social class children. Children were assigned to one of the four groups according to severity of problem.

Procedure: Schools on the block system were allotted three 5 week blocks of time throughout the school year. When a school was in the scheduled block, speech services were provided four days a week for the five week period; when not in the block, speech services were provided one day per week, according to the therapists' judgment of a child's need. Under the intermittent system, the children were scheduled twice a week until the end of the school year or until dismissed from speech therapy. Under the block system, the speech correctionist had a continuous case load of from 35 to 40 cases per week for each five week block; the weekly case load under the intermittent system was 80 to 100 children. The Templin-Darley Articulation Test was given before and after therapy. The results were used in determining an adjusted Arizona Articulation Proficiency Score.

Results: When the total group on the block system was contrasted with the total group on the intermittent system, the speech gains evidenced by children on the block system were consistently and significantly greater. Since the average minutes of speech therapy received for the school year was less for children on the block system, this administrative arrangement may make it possible to serve larger numbers of children. In comparing severity groupings, the difference in speech gains between the two systems of scheduling reached statistical significance for the moderately severe grouping. Statistical significance was not reached for the other groupings.

Stephens, T. M., and Gibson, A. R. (Editors) *Pathways to Progress: A Research Monograph from Ohio's Programs for the Gifted Child.* Columbus, Ohio: Ohio State Board of Education, 1964.

Purpose: To present (a) research studies sponsored by the Ohio Department of Education and carried out by university and public school personnel, and (b) studies conducted by local school systems on programs for gifted children.

Procedure: These studies were gathered by the Director, Division of Special Education, Ohio State Department of Education, published in monograph form, and distributed for use by the public schools.

Results: The monograph includes research of interest to administrators, such as measurement of attitudes and basic information concerning gifted children; social relations of gifted children in regular and ability grouped classes; family and personal dynamics associated with school achievement among gifted children; identification of intellectual giftedness; the frequency of underachievement; followup study of high ability high achieving Ohio secondary school graduates; analysis of creative thinking tasks; degree of consistency and factors related to consistency in group intelligence test scores of gifted children; effectiveness of the English 2600 course; and an evaluation of a project for gifted children in an Ohio county.

McPherson, H., and Stephens, T. M. *Developing a Work Experience Program for Slow Learning Youth.* Columbus, Ohio: Ohio Department of Education, 1964.

Purpose: To demonstrate the feasibility and value of a work school program for slow learning (educable mentally retarded) high school students.

Subjects: All eleventh and twelfth grade students enrolled in special education classes for slow learners in the Dayton Public High Schools. There were 215 students participating in the program as of June, 1963, with a mean CA of 8-6 and IQ range from 52 to 82, with a mean of 73.

Procedure: This three year study resulted from the cooperation and collaboration of the Division of Special Education, of the Ohio Department of Education, the Bureau of Vocational Rehabilitation, and the Dayton Public Schools. A Citizen's Advisory Committee consisting of 26 leading businessmen, labor representatives, and members of the Ohio State Employment Service assisted in gaining acceptance of the program by labor and management. A Technical Advisory Committee was organized to function as a legislative body to regulate and control the operations of the project and to assure that it conformed to prior agreements. Administration of the work experience program was the responsibility of a coordinator in the Department of Special Education of the Dayton Public Schools.

Results: Many job opportunities in the unskilled service areas were found in the Dayton community which proved suitable for slow learning high school students. Primary sources for work experiences were in food service, porter and custodial occupations, and hospital work. Large factories were found unsuitable for job placements due to the complexity of operations, personnel practices, and union concerns. Domestic work in private homes and gasoline stations was also found to be of questionable value because of the lack of supervision.

Measurements used to seek criteria for identifying students most likely to be successful were IQ scores, achievement test results, and teacher ratings: none of these measures, however, proved to be predictive of job success. This project demonstrated that a work experience program requires the cooperation of vocational rehabilitation, state employment service, and business and labor leaders. Building principals were also essential in modifying school practices and gaining acceptance of work experience as a legitimate part of the curriculum. Teachers tended to accept the program when their principals supported it.

CONCLUSIONS

The rapid increase in the number of public, private, and residential special education programs created many administrative problems with respect to providing needed services for children. In reacting to these problems, administrators in different educational settings have developed a variety of organizational, supervisory, and administrative procedures. Unfortunately, many administrative practices have evolved gradually with little or no evaluation or assessment.

A few administrators have attempted to apply evaluative measures to programs already in operation, but retrospective evaluations have limitations. The probability of an objective appraisal is increased markedly if the goals, procedures for conducting the study, and the evaluative techniques are selected before the study begins.

The evaluative study has potential for bringing about changes in policies, procedures, and legislative enactments. If carefully planned, this type of study can also have implications for educational agencies other than the one which conducted the study.

Project evaluation studies have been conducted in a number of different content areas such as work experience programs, vocational rehabilitation, educational programs for gifted children, the use of subprofessional personnel, and different scheduling practices for speech handicapped children. Another parameter of interest to the administrator is the evaluation of different kinds of cooperative arrangements for planning and mobilizing community and state resources.

There is a need for action research to explore new ideas and new approaches to administrative problems. A carefully planned demonstration project is an excellent means for studying different administrative and organizational approaches, providing that careful attention is paid to evaluation from the project's inception.

DIRECTIONS FOR FUTURE RESEARCH

Terminology

There is need for the administrator to evaluate the use of the many terms and labels which have been applied to the handicapped population. At present, administrators are using terms and definitions which have been developed by a number of different disciplines for a number of different purposes. Terminology, for example, may hold implications for diagnosis, etiology, prognosis, developmental changes, function, structure, adaptive behavior, remediation, or classification. In many instances the inappropriate use of terminology by administrators has resulted in administrative confusion, exclusion of children from legislative intent, exclusion or inappropriate placement of children in educational programs, the confounding of data collection, and the impairment of future planning.

Terminology for use by administrators should be selected on the basis of administrative relevance. It is suggested that it may be inappropriate for administrators to persist in using terminology and definitions which have been formulated for use by legislators, neurologists, pediatricians, and psychologists.

The administrator who is responsible for hundreds of students must utilize an administrative taxonomy that (a) facilitates administrative management and record keeping; (b) assists in grouping for placement in appropriate educational programs; (c) aids in the systematic gathering of data which can be used for projected program needs, and can be combined with data from other school districts, counties, regions, and states; and (d) aids in the development of comprehensive legislation, policies, and regulations at the federal, state, and local levels. If the present use of "administrative terminology" were evaluated in terms of administrative relevance, the information could be used to develop an appropriate taxonomy for administrators.

Prevalence Data

In the past, prevalence data have been gathered by districts, counties, and state and federal educational agencies. The procedure usually consists of survey research through questionnaires, which have a number of obvious limitations. It is essential that definitive data be gathered regarding the prevalence of handicapped children in the United States. No studies of the type reported in Kirk and Weiner (1963) appear in the recent literature. Research should take into account prevalence differences between areas of different economic and demographic characteristics, such as educational level, white and nonwhite population ratio, and age level of population. With increased diagnostic services available in the public schools, it is now possible to conduct both large and small scale prevalence studies, district by district and state by state. While state offices of education may not have the personnel to conduct research of this kind, collaboration between school districts and institutions of higher education should be able to provide definitive prevalence data established by competent professional personnel.

Early Identification and Educational Diagnosis

Because most special education programs for the handicapped are organized for children of school age, many children are not identified as having learning or behavioral problems until after they enter school. Studies describing the mobilization of school and community resources for early identification and diagnosis will provide administrators with alternative approaches for their problem. There is also need to evaluate the effectiveness of early identification practices.

Personnel

One of the major problems confronting administrators is the recruitment, selection, retention, and supervision of personnel. Some of the questions that need to be resolved are: What minimal skills and competencies are needed by teachers of the handicapped to accomplish their purpose? What kinds of experiences and training are necessary to achieve minimal levels of competency? To what extent are special institutes, workshops, or summer programs effective in modifying the practices of teachers? The administrator, as a consumer of the products of teacher training programs, is able to provide evaluative information which could be used to improve college or university training programs.

Another critical area which should be investigated is the use of supportive personnel for alleviating the teacher shortage in special education. How can subprofessional personnel be used effectively? What kinds of ancillary personnel can be utilized in screening, identification, and service? How can the training of regular classroom teachers be modified for providing support to handicapped children who spend part of their time in the regular classroom? To what extent can traveling diagnostic and clinical teams be most effective in providing regional needs? How can home demonstration workers be made more effective in their work with parents? In discussing problems in sparsely populated areas, Martinson (1966) raises a number of interesting questions concerning the use of personnel in rural areas.

The role of the administrator of special education programs should be studied at the local, intermediate, state, and federal levels. The function and role of the administrator and his staff should be studied over a period of time as the program passes through one stage of development to the next and the range of activities increases.

Financial Support

Although it is generally accepted that special education programs are more expensive than educational programs for nonhandicapped children, there is very little reliable information as to the true costs. At the present time, research literature offers little information regarding the kinds of financial patterns which are being used and their effectiveness in supporting educational programs. There is need to study the financial patterns of the federal, regional, state, intermediate, district, and local district levels.

Calovini (1966) points out the need for research in a number of different areas:

Review of Systems to Determine Most Equitable, Efficient, and Economical Means of Support.

1. Examination of the types of legislation which have strengthened or may strengthen a program in special education.
2. An analysis of special needs of rural areas recognizing that patterns of financial urban programs may not be effective in sparsely populated school districts.
3. Examination with a critical concern for additional financial provisions which may be needed by rural or regional programs.
4. The feasibility of planning comprehensive regional programs which are not necessarily limited by political borders.
5. Investigation of the relationship between good organizational patterns and effective use of money for program support.
6. A study of the present system of allocating funds to determine that they are used for special education services and further to study the effectiveness of the expenditures.
7. Investigation of how states can provide an adequate financial structure which will support the types of program organization to which the state is committed.
8. A study of financial arrangements in the acquisition of special facilities [pp. 10-11].

Special Education Cost Index Variables.

1. What are the costs relative to special classes, resource personnel, ancillary, services, institutional programs, semiresidential programs, and foster homes?
2. What are the costs in respect to program size, number of children, and geographic factors?
3. What factors account for differences in local attitudes toward financial support of education? What factors account for variations in interest in special education where (a) general education is of high quality or (b) general education is not of high quality?
4. What different sources of financial support can be identified?
5. What constitutes an adequate financial level of public school support for a special education program that is (a) minimal, (b) adequate, and (c) superior?
6. To what extent does a variation in tax ability affect program support?
7. What kinds of incentives of state aid can be used to support a local tax effort?
8. In view of the density-scarcity factor and the most effective programs and their locations, as well as the needs of programs, which patterns of finance are more efficient and effective: (a) separate special education tax and administrative unit, or (b) intermediate and/or overlapping districts?
9. In the event of intermediate and/or overlapping districts, what relations are needed with local districts, ancillary services, etc.?
10. How can we develop refinement in the formula of correction for sparsity?
11. What kinds of procedures can be developed at the federal, state, and intermediate levels? [pp. 11-12]

Administrative Organization

Special educational programs are organized in a number of ways, including the individual district, multiple districts, parish and county programs, and regional or multicounty cooperative agreements. There is need not only to describe the different kinds of administrative arrangements, but also to explore the effectiveness of these arrangements in terms of utilization of personnel, financial support, administrative efficiency, supervision, and the extent to which these administrative arrangements are meeting the needs of children. It is necessary to study the creation of administrative units which not only cut across city and county lines but state boundaries as well. Isenberg (1966) discusses the need for an intensive study of existing administrative patterns for providing special education services. These include:

1. What are the various types of area programs now in operation?
2. What are their organizational characteristics? How are functions allocated and responsibilities assigned?
3. How adequate are the programs provided? How efficient? What are the organizational strengths and weaknesses? What special problem do they encounter?
4. How do they relate to local school districts? To the state education department? To the total state system of schools?
5. Does the area nature of program operation encounter special difficulties in working with other agencies?
6. How much flexibility do they have for program adaption? For extending special education services? For undertaking other than special education functions? [pp. 7-8]

Of particular importance are the content and organization of various advisory or executive boards which make up the legal entity of a joint agreement, county, or intermediate district organization. An attempt to coordinate the efforts of 45 school districts or eight or ten counties in a single administrative pattern produces many problems for the special education administrator. There is need to study the roles and functions of various personnel and their relationships to the local school superintendents, the administrative staff of the program, and the executive or advisory board.

Supportive Services

Another area in which research is needed is the way in which supportive services relate to public school special education programs. Fliegler (1966) defines supportive services as "... continuous life services which support the educational process. They include clinical services, social services, vocational services, educational services for children, education of professional personnel, and research training." Fliegler discusses a number of problem areas for research. These include: attitudes and values of the family and the child toward supportive services and vocational goals; influence of cultural and regional characteristics upon the development of supportive services; unification of supportive services provided by the community, state, regional, and federal levels; and changes in structure and function of existing agencies to make them more effective.

State Legislation

State legislation is a challenging problem area for research. One of the first research tasks that should be undertaken is that of describing different legislative patterns. With this information it will be possible to conduct comparative studies between states with different legislative patterns. There are a number of legislative parameters which need to be investigated, including:

1. How does terminology affect provision of special educational services?
2. What age range is included in legislative provisions?
3. What kinds of special facilities and special services are included in the law?
4. What kinds of supervisory boards, advisory committees, or council groups are established by legislation?
5. On what level of state or local government are these groups formed?
6. To whom does the legislation apply—special charter districts, community consolidated school districts, community unit school districts, high school districts, nonhigh school districts, community high school districts, counties, parishes, or regional or multicounty organizations?
7. What powers and duties are given to school boards?
8. What provisions are included for children who reside in one district and are attending school in another district?
9. How is per capita cost computed?
10. What is the reimbursement formula?
11. Who determines eligibility of children for admittance to special classes?
12. What provisions are included regarding teacher qualifications?
13. What kinds of arrangements are available for traineeship and fellowship programs?

14. What provisions are available for educational materials coordinating units?
15. What appropriations are made available to implement the program?
16. Are there provisions for encouraging multidistrict or multicounty regional programs?
17. Is research in education written into law?
18. Where in power structure are state special education programs?
19. How is legislative support obtained?
20. How does the status of program growth relate to legislation?
21. What are the relative merits of mandatory and permissive legislation?

Factors Related to the Support of Special Education Programs

Research is needed to determine which variables are related to the presence or absence of special education programs and the extent to which these variables contribute to program support. Crossvalidation studies in states of different demographic and economic characteristics are needed. Large metropolitan areas should probably be compared with each other rather than with small school districts or counties within a state.

Model Programs and Model Legislation

Research procedures which include the detailed gathering of data, description of existing programs, legislation, and comparative studies within and between states provide one kind of research approach. In addition, there is an urgent need for administrators to take an action oriented approach to problem solving. Action research may be described as the initiation and evaluation of new procedures or programs within the framework of a service agency. Field testing provides the opportunity to observe and study the effectiveness of administrative approaches and, if necessary, to make appropriate modification.

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